

CANADIAN INDUSTRY IN 1871

Research Report 8

INDUSTRIAL LEADERS: THE LARGEST MANUFACTURING FIRMS OF ONTARIO IN 1871

Elizabeth Bloomfield and G.T. Bloomfield

Elizabeth Bloomfield, series editor

December 1989

HD2356.C3205X 1989



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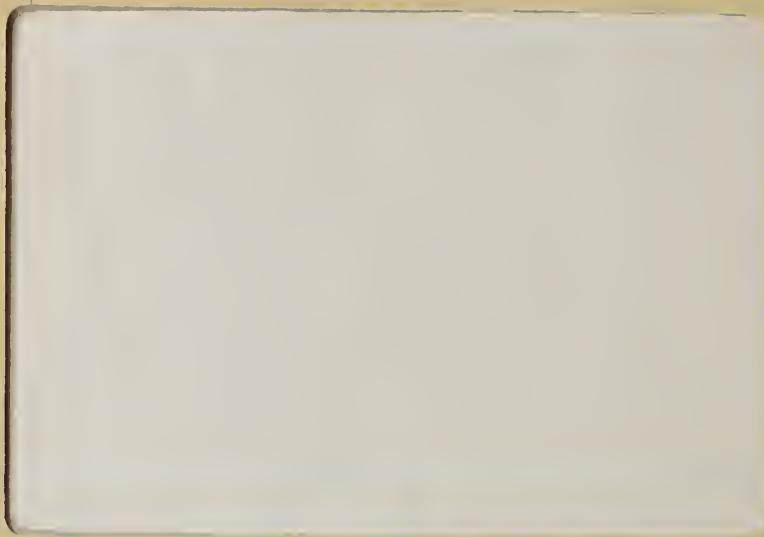


MILLS & FACTORY OF T.P. WHITE EAST WHITEVALE, PICKERING T.H. ONT.

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Cover Illustration (selected and described by G.T. Bloomfield)

The view of Whitevale, Township of Pickering, was chosen to illustrate Canadian industry in 1871. At this time, a high proportion of manufacturing activity was still located in small settlements, some of which were growing rapidly into towns. Lovell's Directory (1871) described Whitevale as:

A thriving village...[with] extensive flouring and woollen mills... Montreal Telegraph Co has an office here. Distant from Whitby, the county town, and a station of the Grand Trunk Railway, 13 miles. Mail daily. Population about 250.

Truman P. White has acquired the water rights at Majorville on Duffin's Creek in 1845 and developed a grist mill, a saw mill and, later, a woollen mill. By 1871 the census enumerated six significant industrial establishments employing 66 workers and with a total value of production amounting to \$125,000. The transition from waterwheels (70 horsepower) to steam engines (66 horsepower) was already apparent in the village by this date. In common with its counterparts across the country, Whitevale's basic industrial activities were closely associated with the local agricultural area. There was also considerable economic integration apparent in the ownership of several establishments by Truman P. White and in the making of staves in the sawmill for the cooper shop which in turn supplied the flour mill with basic containers for transporting the flour to market.

Unlike many of its contemporaries, Whitevale has remained about the same size ever since 1871. The 1971 census recorded a population of only 273 in the unincorporated settlement. Whitevale never achieved connection by railway, county road or provincial highway. Much of the surrounding land was acquired for the planned Pickering airport and new town in 1972/3 and today the settlement is threatened by the creation of a municipal solid waste dump for Metropolitan Toronto and the Durham Region.

The illustration was first published in the **Illustrated Historical Atlas of the County of Ontario** (Toronto: J.H. Bees and Co., 1877), reprinted Ross Cumming, 1972).

HD2356.C3205X 1989



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CANADIAN INDUSTRY IN 1871 PROJECT
Department of Geography
University of Guelph
GUELPH, ONTARIO
NIG 2W1

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Canadian Cataloguing in Publication Data

Bloomfield, Elizabeth.

Industrial leaders : the largest manufacturing
firms in Ontario, 1871

(Canadian industry in 1871 ; 8)

Includes bibliographical references.

ISBN 0-88955-194-4

1. Ontario - Manufactures - History. 2. Ontario -
Industries - History. 3. Industries, Size of -
Ontario - History. I. Bloomfield, G. T. (Gerald T.).
II. University of Guelph. Dept. of Geography.
III. Title. IV. Series.

HD2356.C3205 1989 338.6'44'09713 C89-090701-3

CANADIAN INDUSTRY IN 1871 (CANIND71) PROJECT

Between 1982 and 1989, a project based in the Department of Geography, University of Guelph, has made machine-readable the full data for some 45,000 industrial firms that were enumerated in Canada's first national census in 1871. A uniquely valuable source is thus becoming accessible to scholars and researchers in several disciplines. The 1871 schedules contain a wealth of information which was not published at the time or later. Although similar details were collected in the censuses of 1881, 1891, 1901 and 1911, none of the manuscript schedules for those years have survived. The CANIND71 database has great significance in being a detailed "snapshot" of industrial activity just after Confederation, at a time of transition in industrial technology, business organization and work discipline. The records include examples of all kinds of industrial work environments from mills and artisanal craftshops in mainly rural settings to factories, manufactories and sweatshops in the growing towns and cities.

The CANIND71 project is important for its methodological experience in handling large quantities of historical data and making them accessible to users. Relevant aspects include the total coverage of all establishments and all variables recorded in the original source and our dedication to making the material available to others in a variety of software environments and with full explanation of the source and methodology. As well as the data for each establishment, we have added precise geographical references and Standard Industrial Classification codes (SIC) for all establishments, which permit both the retrieval of details for individual businesses and their systematic aggregation by industry type or geographical area.

Creation of the CANIND71 database has been assisted by several grants from the Social Sciences and Humanities Research Council of Canada between 1985 and 1989. The most substantial of these were Grants 482-87-0010 and 482-88-0010 to Elizabeth Bloomfield as principal investigator, in the Strategic Grants Program: Women and Work Theme. These grants, totalling \$114,000, supported the most intensive phase of database creation in 1988 and 1989. Other SSHRC grants to Elizabeth Bloomfield (principal) in 1985 and to Kris Inwood (principal) in 1988 have also helped. In addition, smaller grants from the University of Guelph to Gerald Bloomfield and Kris Inwood have supported the project for short periods. Personal funds have also been necessary. Some preliminary activity on the Maritime data during 1986 was assisted by a grant from St Mary's University, Halifax, to Professor Inwood and Professor John Chamard.

The officials responsible for the original 1871 Census of Canada believed that the information they collected and collated was "as accurate as is humanly possible." In our turn, we are devoting several months in 1989-1990 to rigorously checking and editing the SAS datasets for Ontario, the Maritimes and Quebec on the mainframe computer. We expect that the final version of the whole database will be available for others to use from January 1991. Those interested in obtaining the whole database or partial datasets should contact Dr Elizabeth Bloomfield, C/- Department of Geography, University of Guelph, Guelph, Ontario, N1G 2W1, after September 1990.

CANADIAN INDUSTRY IN 1871 PROJECT: RESEARCH REPORTS

1. **Industry in Ontario Urban Centres, 1870: Accessing the Manuscript Census**, Elizabeth Bloomfield, G.T. Bloomfield, Janine Grant and Peter McCaskell (1986).
2. **Water Wheels and Steam Engines: Powered Establishments in Ontario**, G.T. Bloomfield and Elizabeth Bloomfield (1989).
3. **The Ontario Urban System at the Onset of the Industrial Era, 1871**, Elizabeth Bloomfield and G.T. Bloomfield (1989).
4. **Creating CANIND71: Procedures for Making the 1871 Industrial Census Machine-Readable**, Elizabeth Bloomfield and G.T. Bloomfield (1989).
5. **Glossary of Industrial Language**, Jane Turner, Janine Grant and Barbara Sibley (1989).
6. **French-English Dictionary of Industrial Language**, Jane Turner, Janine Grant and Barbara Sibley (1989).
7. **Standard Industrial Classifications Applied to Historical Data: the Case of the 1871 Industrial Census**, G.T. Bloomfield and Elizabeth Bloomfield (1989).
8. **Industrial Leaders: The Largest Manufacturing Firms in Ontario, 1871**, Elizabeth Bloomfield and G.T. Bloomfield (1989).
9. **The Hum of Industry: Millers, Manufacturers and Artisans of Wellington County**, Elizabeth Bloomfield and G.T. Bloomfield (1989).
10. **Boundaries of Canadian Census Units in 1871**, G.T. Bloomfield (1990).

ACKNOWLEDGEMENTS

The interest and support of all who have assisted with this project are gratefully acknowledged. During the earlier phases, Janine Grant and Stephen Bellinger coded data for Ontario's urban places. Janine Grant was on the project staff from May 1985 to June 1989, joined during the final 18 months by Barbara Sibley. The quality of the final database owes much to their careful and thorough work. Peter McCaskell, first as programmer-analyst in the Department of Geography and then from Computing Services, has helped substantially with database management and programming through all phases of the project. We appreciate the shelter provided to this project by the Department of Geography, University of Guelph throughout the 1980s. We are also grateful to the Social Sciences and Humanities Research Council of Canada: Strategic Grants Program for its financial assistance during 1988 and 1989 which has enabled us to complete the creation of the CANIND71 database.

CONTENTS

	page
1 Introduction: the 1871 data source	1
<i>Figure 1: Barber Brothers woolen mill in Streetsville, Peel County</i>	2
<i>Figure 2: William Hamilton's St Lawrence Foundry, Toronto</i>	4
2 Measuring the size of industrial firms in 1871	6
<i>Table 1: Numbers of industrial businesses among top hundred in Ontario, ranked by various measures</i>	8
<i>Table 2: Ontario's largest businesses in industry groups, by four alternative measures</i>	9
<i>Figure 3: Ontario's largest businesses in industry groups, by four alternative measures</i>	10
<i>Table 3: Summary data of sixty selected largest businesses</i>	12
3 Profile of Ontario's largest industrial firms in 1871	13
<i>Table 4: Ontario establishments by firm size</i>	13
<i>Table 5: Ontario establishments by output size classes</i>	14
Evaluation of manuscript census evidence for largest firms	14
<i>Figures 4-7: Evidence of the Waterous engine works, Brantford</i>	16-18
<i>Figures 8-13: CANIND71 records for selected firms: Perley & Pattee, Gooderham & Worts, James Williams & Co, John Paterson & Co, Hunter Rose & Co, Wilson Bowman & Co, Patterson Brothers, Young Law & Company, Henderson & Bostwick</i>	21-26
Range of industrial types	28
<i>Table 6: Largest businesses by major industry groups: single measures compared with composite index</i>	29
Locations	30
<i>Figure 14: Distribution of largest businesses, 1871</i>	31
<i>Figure 15: Urban centres, railways and telegraph offices</i>	32
Power technology and work environments	33
<i>Table 7: Power used in Ontario industry: summary data</i>	33
<i>Table 8: Type of power used by largest firms</i>	34
Status and linkages	35
<i>Figure 16: Wilson Bowman & Company of Hamilton</i>	37
<i>Figure 17: Joseph Hall Company of Oshawa</i>	38
<i>Figure 18: Tuttle, Date & Rodden of St Catharines</i>	40
<i>Figure 19: Canadian Engine & Machinery Co of Kingston</i>	41

4	Measuring industrial dominance in 1871	42
	<i>Table 9: Concentration in selected industry groups, 1871</i>	43
	<i>Figure 20: Concentration in selected industry groups, 1871</i>	44
	<i>Table 10: Concentration: the leaders-sector ratio, 1871</i>	45
	<i>Table 11: Mean value of fixed capital investment, Ontario firms employing at least 26 workers in 1871</i>	47
	<i>Figure 21: Distribution of Ontario sewing machine manufacturers, 1871</i>	48
	<i>Table 12: Structure of Ontario cabinet and furniture making sector, 1871</i>	49
	<i>Figure 22: Distribution of Ontario cabinet and furniture makers, 1871</i>	50
5	Measuring business survival and longevity	52
	<i>Table 13: Beginning dates of Ontario's largest industrial firms operating in 1871</i>	53
	<i>Table 14: Cessation dates of Ontario's largest industrial firms operating in 1871</i>	53
	<i>Figure 23: Longevity of largest industrial businesses by sector</i>	54
	<i>Table 15: Start and end decades of largest industrial firms operating in 1871</i>	55
	<i>Table 16: Average longevity of Ontario's largest industrial firms operating in 1871</i>	56
	<i>Figure 24: Dickey, Neill & Company's Soho Foundry, Toronto</i>	58
APPENDICES	Introductory note, including glossary	59
A-1	Leading 100 Ontario industrial firms by value of output	60
A-2	Leading 100 Ontario industrial firms by number employed	62
A-3	Leading 100 Ontario industrial firms by fixed capital	64
A-4	Leading 100 Ontario industrial firms by value added	66
A-5	Use of power technology by largest industrial firms	68
A-6	Longitudinal profile of largest industrial firms	69

1 INTRODUCTION: THE DATA SOURCE

How much is known of the identity and operations of the largest industrial businesses of a century ago and earlier? Our knowledge depends mainly on the lucky accident of survival, both of the businesses themselves and of their records, and consequently on any business histories or other special studies that were based on access to those records. Thanks to the efforts of popular and academic historians, we know a good deal about the Masseys, for example, but how did their business rank among its peers a century ago and more? How representative were the famous survivors of all businesses operating at particular times? Little systematic and comparative evidence remains from the pre-1914 era, with the notable exception of the manuscript returns for industrial establishments recorded as part of the 1871 Census of Canada.¹

The manuscript data, recently made available on microfilm as part of the whole 1871 manuscript census by the National Archives, constitute a uniquely valuable source for Canada. Although similar details were collected in the censuses of 1881, 1891, 1901 and 1911, none of the manuscript schedules for those years have survived. While the 1851 and 1861 census manuscripts are extant, their format is much more awkward to use, the more limited industrial details being scattered through the household schedules. Moreover, the 1871 schedules contain a wealth of information which was not published at the time. In the United States, equivalent manuscripts have survived from the 1850, 1860, 1870 and 1880 censuses. Their data have been partially exploited during the past 15 years by a team at Indiana University, whose purposes and methodology may be compared with those of the CANIND71 project reported here.²

Canadian census enumerators in 1871 were instructed to record "all industry of any importance which is conducted in separate establishments or workshops." An industrial establishment was defined as "a place where one or several people are employed in manufacturing, altering, making up or changing from one shape into another, materials for sale, use or consumption, quite irrespectively of the amount of capital employed or of the products turned out."³ No minimum value of output was set, in contrast to the United States, where only establishments with at least \$500 worth were included. The range

¹ An earlier version of this paper was presented at the Second Canadian Business History Conference, Victoria, B.C., March 3-5, 1988.

² The US database and the procedures of the project based at Indiana University are described in Fred Bateman and Thomas Weiss, A Deplorable Scarcity: The Failure of Industrialization in the Slave Economy (Chapel Hill, 1981): 23-26 and Appendix A; Jeremy Atack, Estimates of Economies of Scale in Nineteenth-Century United States Manufacturing (New York and London, 1985): 40-81. While this project mainly used a sample of all establishments, it also captured the details for the 20 largest industrial firms in each state.

³ "Manual Containing the Census Act and Instructions to Officers Employed in the Taking of the First Census of Canada, 1871", Canada Sessional Papers No 64 (1871): 138.

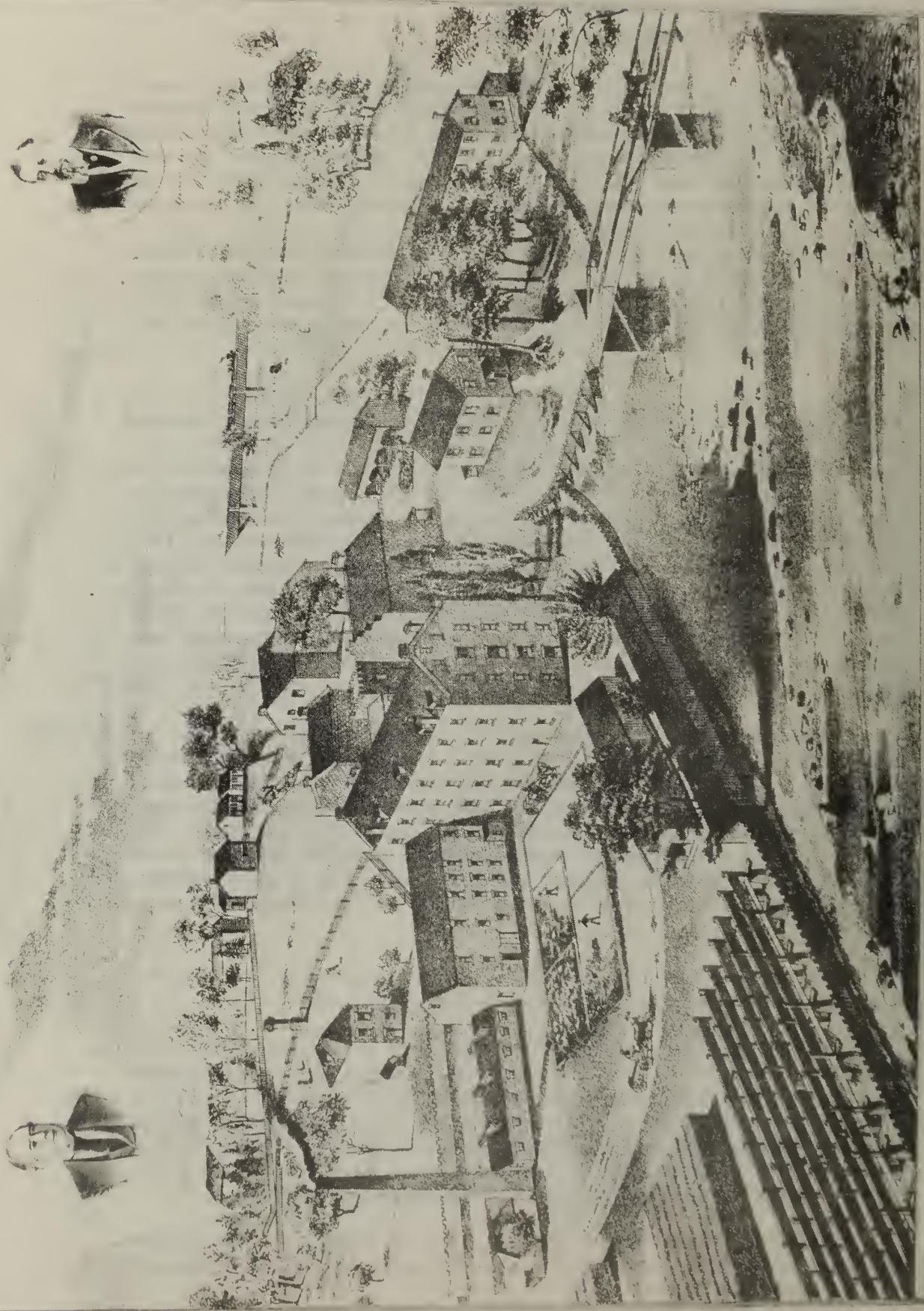


Figure 1: The Barber Brothers' woollen mill at Streetsville was one of the largest integrated textile factories in Ontario. All processes from scouring, carding, spinning, dyeing, weaving to the final finishing of the tweed cloth took place in the mill complex. The mill was established in 1843 and rebuilt in stone after destruction by fire in 1861. Source: Illustrated Historical Atlas of the County of Peel 1877 (Cumming reprint 1977), p.37.

of variables is similar to that in the U.S. censuses for 1850-1870, except that Canada recorded "floating" or working capital in addition to "fixed" capital (real and personal estate), the number of working months in the year, and the number of girls employed as well as numbers of men, women and boys. On the other hand, the Canadian data do not permit a separation of the wage costs of men, women and youths.

A current project, which has been making this unique source machine-readable as the CANIND71 database, enables us to identify the largest industrial firms of Ontario in 1871. The data themselves, in the way they have been made machine-readable, offer considerable potential for all kinds of research.⁴ Aspects of our project which will be useful to business historians include the total coverage rather than use of any sample, and the manner in which each establishment has been assigned locational references and a Standard Industrial Classification code. These allow for both the retrieval of data for individual businesses and their systematic aggregation by industry class or geographical area. Thus we may obtain **both** specific details for particular firms operating in 1870-71 **and** valuable generalized information to provide a context of industrial structure and regional pattern.

Could we have used a sample rather than choosing "the monumental task of recompiling the census"? Sampling techniques are commonly used by social scientists in using historical demographic data from the nominal census, though historians have usually chosen to capture the full population, at least for defined territorial areas. In its use of the U.S. manuscript censuses of manufacturing for 1850, 1860, 1870 and 1880, the Indiana University team took a random sample of about 200 firms, together with full details for the largest 20 firms in each state.⁵ But not only would the U.S. project have had to

⁴ The CANIND71 database and methodology are described in several reports and papers including: Industry in Ontario Urban Centres, 1870: Accessing the Manuscript Census, #1 in this series of research reports; Creating CANIND71: Procedures for Making the 1871 Industrial Census Machine-Readable, #4 in this series; and Standard Industrial Classifications Applied to Historical Data: the Case of the 1871 Industrial Census, #7 in this series. For examples of the use of the database in relation to various fields of study, see other research reports in the series and articles such as "Making the Census Manuscript Schedules Machine-Readable: Industry in Ontario Urban Centres," Machine Readable Archives Bulletin 4, 3 (1986); "Manuscript Industrial Schedules of the 1871 Census of Canada: A Source for Labour Historians," Labour/Le Travail 19 (1987): 125-131; "As accurate as is humanly possible": Accessing the Manuscript Schedules of the 1871 Census of Canada," Archivaria 23 (Winter 1986-87): 185-192; "Mills, Factories and Craftshops of Ontario, 1870: A Machine-Readable Source for Material Historians," Material History Bulletin 25 (1987): 35-47; "Using the 1871 Census Manuscript Industrial Schedules: a Machine-Readable Source for Social Historians," Histoire sociale/Social History (1987) 19 (1986): 427-441.

⁵ The Indiana University project's sampling procedures yielded a sample size of 5,904 for 1850, 6,328 for 1860 and 4,859 for 1870, with sample proportions varying from .01 to 1.00 from state to state: Atack, Estimation of

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consider formidable total numbers of establishments in several census years; its objectives were more limited than ours in serving only economic historians who were interested mainly in aggregate data. Factors in our decision for total coverage were the uniqueness of the source in Canada, the inadequacy of the published data as a universe for any sample, and the many and varied research purposes we expected to serve by making the manuscript material machine-readable.

The CANIND71 database has been designed to serve a wider range of research interests, including those concerned with the rich variety of individual enterprises in particular areas as well as the aggregate patterns. Scholars and researchers in some disciplines - such as social and labour history and the history of material culture and technology - may be primarily interested in retrieving data for individual establishments or for small industrial groups or geographical areas. For such users, the aggregate patterns of the database provide a comparative context. Geographers and economic historians place a greater emphasis on the aggregate patterns, which may now be drawn more accurately and may also be illuminated by a broad variety of individual firm experiences. We decided against a sample because of our goal of linking macroscale and microscale, the broad generalizations with the particular details for individual firms, for industry groups, or for communities, cities and regions.

In identifying and describing the characteristics of the largest industrial firms in 1871, this report is in one sense concerned with a sample -- a stratified sample of all the industrial businesses enumerated in the census as operating in that year. The focus in this study is on the individual firm in its industry context, while some other reports in the series consider themes such as the degree of urban concentration of industrial activity or the significance of inanimate power sources.⁶ This study of the largest industrial firms is interesting in linking the census evidence to information from other contemporary sources. The term "leaders" is sometimes used here as a synonym for the group of industrial businesses that have been identified as the largest operating in Ontario in 1871. It is used in this quantitative sense rather than with a connotation of technological leadership.

In the next section of the report, we comment on our methods of identifying and ranking Ontario's largest manufacturers in 1871 and discuss some of the problems of such an exercise. Then we present the results of some analysis of the main characteristics of the sixty selected businesses-- their variety of industry types, their patterns of geographical location, their use of power technology and work environments, and the status of their entrepreneurs and interlinkages with other businesses. Industrial concentration

Economies of Scale, 44. The basic sample was supplemented with a dataset of the largest 20 firms in each state.

⁶ See G.T. Bloomfield and Elizabeth Bloomfield, Water Wheels and Steam Engines: Powered Establishments in Ontario, #2 in this series; Elizabeth Bloomfield and G.T. Bloomfield, The Ontario Urban System at the Onset of the Industrial Era, #3 in this series.

or dominance is the subject of the fourth section. Finally, we discuss some aspects of a more longitudinal survey of the sixty enterprises, both before and after the 1871 census date.

2 MEASURING THE SIZE OF INDUSTRIAL FIRMS

Several measures of significance have been used by other scholars in selecting industrial leaders. Value of output was the criterion in the various papers by Atack and Bateman and Weiss that are based on samples from the United States manuscript censuses of 1820, 1850, 1860 and 1870.⁷ For Britain, where industrial activity was not systematically recorded in the census until the early twentieth century, there have been several attempts to rank the largest manufacturers on the basis of other evidence. Peter Payne used the Stock Exchange Year-Book for 1905 to rank the 52 largest industrial companies by their value of capitalization.⁸ Leslie Hannah compiled an unpublished list of the 200 largest British companies in 1919, measured by market value of capital. Christine Shaw used the Red Book of Commerce supplemented by additional information on specific businesses to obtain a ranking of the 102 largest employers in manufacturing in 1907.⁹ Lewis Johnman has used a variety of sources to identify the largest industrial employers in Britain in 1935.¹⁰ Shaw and Johnman also discussed the problems of relying on a single measure or source of data.

Ideally, where data are available, we should consider not just one but several measures of significance. These might include, in addition to the more commonly used gross value of production, the number of workers employed and the value of capital investment, the value added in the manufacturing process as well as some weighted combination of these four variables. In practice, it is seldom possible to carry out such a balanced exercise, but for Ontario in 1871 we are fortunate in being able to use the systematic data of the manuscript census of industrial establishments.

In identifying the leading manufacturers in Ontario in 1871, we began by ranking all the more than 21,730 industrial establishments in Ontario by four different measures -- number of workers employed, gross value of production, value of fixed capital invested, and value added in the manufacturing

⁷ Data for large firms are particularly discussed in Atack, "Firm Size and Industrial Structure in the United States During the Nineteenth Century," Journal of Economic History 46 (1986): 463-475.

⁸ Peter Payne, "The Emergence of the Large Scale Company in Great Britain, 1870-1914," Economic History Review 2nd ser. 20 (1967): 519-542.

⁹ Christine Shaw, "The Large Manufacturing Employers of 1907," Business History 27 (1985): 42-60. Hannah's unpublished work is cited by Shaw, p.43.

¹⁰ Lewis Johnman, "The Largest Manufacturing Companies of 1935," Business History 28 (1986): 226-245.

process.¹¹ Lists of the hundred largest businesses by each separate measure were first compiled and then compared. We found that, in Ontario in 1871, the hundred largest firms by value of output produced goods with an aggregate value of at least \$135,000, and that as six businesses tied for 98th place with that value, 103 firms had to be considered (Appendix A-1). As nine firms tied for 97th place with at least 80 workers each, we had to include 105 businesses on this measure (Appendix A-2). The most highly capitalized firms in Ontario reported fixed capital of at least \$45,000; four businesses tied for 98th place so 101 were included in all on this measure (Appendix A-3). The top hundred enterprises by added value had at least \$52,000 added in the process of manufacturing (Appendix A-4).¹²

How similar were the lists of businesses ranked by the four measures? Could one measure suffice as a guide to the leading manufacturers? In all, 211 different enterprises were identified by this method as ranking among the top one hundred Ontario businesses on at least one measure of size. Only 37 businesses ranked among the top hundred in Ontario on all four measures, and a further 23 on three of the four measures in some combination. Forty-two

¹¹ The census was taken in early April 1871, and enumerators were expected to report industrial activity during the twelve months between April 1, 1870 and March 31, 1871. We derived our total numbers of employees by summing the "average numbers of people employed" which were distinguished into males and females over and under 16 years. Our data for capital investment are from the reported "value of fixed capital invested" which was intended to include land, buildings and machinery. Our value of production is the "aggregate value of products" reported; data for added value was derived by subtracting the aggregate value of raw materials from the aggregate value of products. "Manual Containing the Census Act and Instructions to Officers Employed in the Taking of the First Census of Canada, 1871," Canada Sessional Papers No. 64 (1871).

¹² We held to the manuscript census data throughout this exercise with two exceptions. The railway workshops of the Great Western Railway in Hamilton and the Northern Railway in Toronto were included despite the absence of production data in the census record, which also prevented any calculation of added value. Our comprehensive scope did help us to find schedules for seven other railway repair shops in Ontario, in addition to the four Ontario establishments reported by Paul Craven and Tom Traves in "Canadian Railways as Manufacturers, 1850-1880," CHA Historical Papers, Vancouver 1983: 254-281. We agree with their surmise that the capital and employment figures for the Great Western and Northern Railways must have included more than the manufacturing functions. Using evidence of the other railway workshops as well as contemporary data in Trout, The Railways of Canada (1871), and as cited by Craven and Traves, we estimated figures for production and added value and also modified the rather dubious values for fixed capital and employment. Had the census data not been so modified to include at least the Great Western shops, we should have missed what was probably the most highly capitalized industrial business and largest employer in Ontario.

firms ranked in the top hundred on only two of the four measures, while 109 ranked on only one measure.

The distribution of leading businesses among the various combinations is set out in Table 1, in which P signifies rank in the top hundred for Production value, E for such rank on Employment, C for rank on the value of fixed Capital, and A for rank on the basis of Added value. Thus the code PACE describes an enterprise which ranked among the top hundred in Ontario on all four measures. Businesses ranking on only three of the possible four measures are given the code ACE for combining leading rank in Added value, Capital and Employment but not Production. Those combining leading rank in Production value, Added value and Capital but not Employment are coded PAC. Leading rank in Production, Added value and Employment but not Capital is denoted by the code PAE. The businesses that combined leading size in only two measures may be coded AC for Added value and Capital, AE for Added value and Employment, CE for Capital and Employment, PA for Production and Added value, PC for Production and Capital, PE for Production and Employment.

Table 1
Ontario: numbers of industrial businesses among top hundred, 1871
ranked by various measures

	one measure	two measures		three measures		four measures	
A	17	AC	4	ACE	7	PAGE	37
C	33	AE	7	PAC	4		
E	30	CE	12	PAE	11		
P	29	PA	15	PCE	1		
		PC	2				
		PE	2				
totals:	109		42		23		37

Note: P: Value of Production; A: Added value; C: Fixed Capital invested;
E: Employment.

One by-product of our attempt to measure industrial success in this period is a general sense of caution in selecting variables for comparative analysis in business history. Figure 3 and Table 2 illustrate how differently the leading businesses may be perceived, depending on the variable one chooses. If value of fixed capital alone had been used to measure business size, the list of industrial leaders would have been weighted toward breweries, cotton and paper mills, and gas and water utilities, all of which were highly capitalized in relation to other measures. If size of workforce only had been considered, sawmills and manufacturers of tobacco products, boots and shoes, and clothing would have been more strongly represented with 21 such firms which ranked high on employment alone but scored low on other measures. If value of production had been the only criterion, the list would have included 19 flour mills, three pork packers and two distilleries which were relatively

low on other measures. If added value had been used alone, firms in the primary metals, metal fabricating, machinery and transportation equipment sectors and oil refineries would have been much more prominent than if gross value of production had been the sole measure.

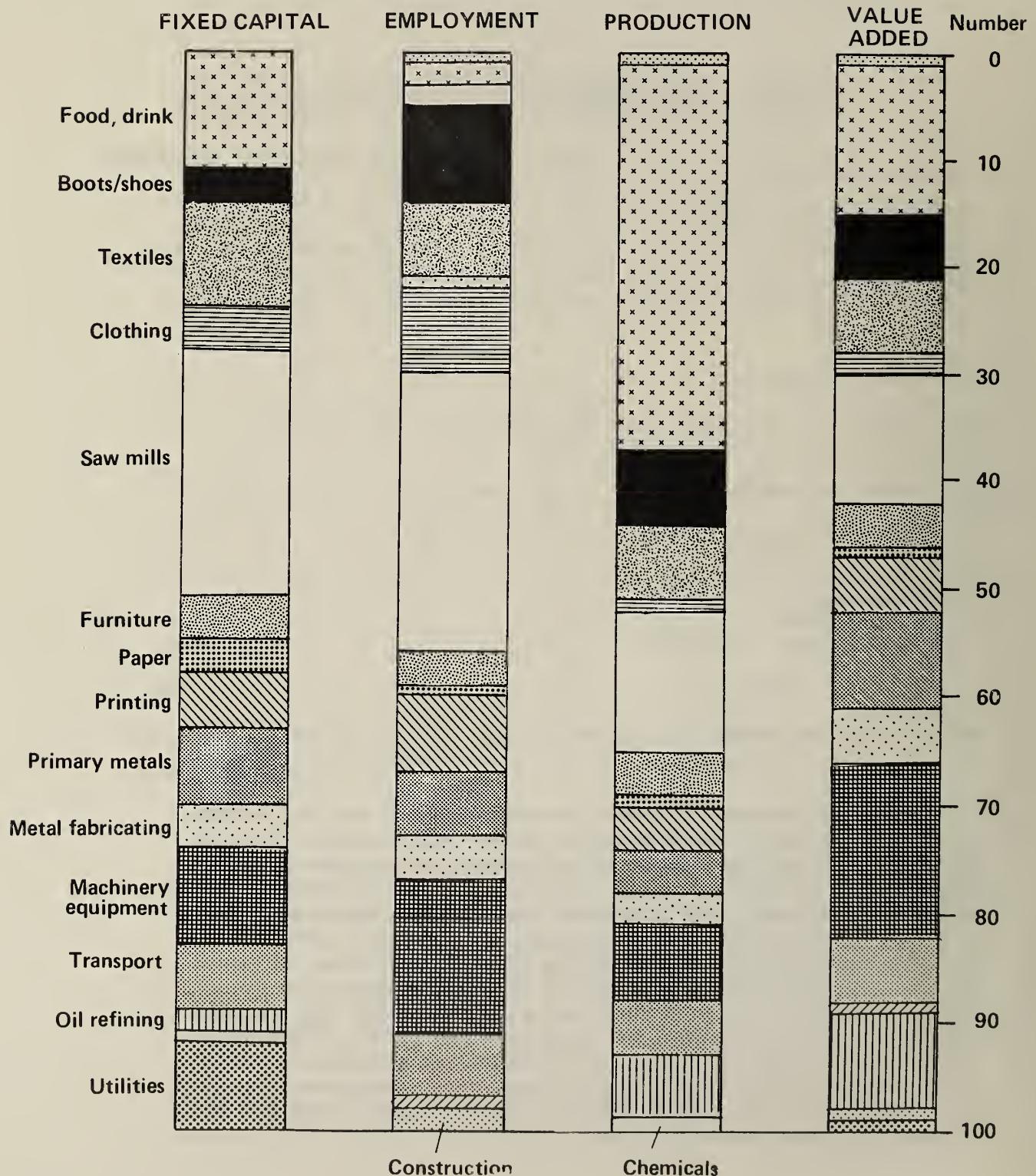
Table 2
Ontario: largest businesses according to various measures
by major industry group, 1871 (numbers of establishments)*

Major Industry Group		capital	employmt	production	added value
2.00 Agricultural services		1	1	1	
4.00 Mining/Quarrying		1			
5.01 Food, drink	13	2	38	15	
5.02 Tobacco		2			
5.04 Leather (boots & shoes)	4	10	8	7	
5.05 Textiles	11	7	7	7	
5.06 Knitting		1			
5.07 Clothing	3	8	1	2	
5.08 Wood processing	22	29	15	14	
5.09 Furniture	5	3	4	4	
5.10 Paper	3	1	1	1	
5.11 Printing	5	7	4	5	
5.12 Primary metals	2	2	2	2	
5.13 Metal fabricating	5	6	4	6	
5.14 Machinery	13	16	8	20	
5.15 Transport equipmt	5	6	3	4	
5.17 Non-metal minerals		2		2	
5.18 Petroleum oil refineries	2		6	9	
5.19 Chemicals			1		
6.00 Construction			1		
7.00 Gas and water utilities	8			1	
TOTALS	101	105	103	100	

Note: * Some businesses are included in more than one column; see text.

Given the discrepancies between rankings based on the four separate variables, we decided to use a composite measure which combined them all. We merged each firm's rankings in all four measures into a composite index of by which it could be ranked overall. The composite index is based on mean rank: a firm's rankings on the four separate measure were summed and divided by four and that mean rank was then arranged in order from the lowest figure up. Thus the Robert Hay company in Toronto ranked 4th among all Ontario firms in value of fixed capital invested, 5th in number employed, 8th in gross value of production and 15th in value added in manufacturing. Summing these individual ranks and dividing by four produces a mean RANK INDEX of 8th. The mean rank indices of all the 211 firms in Ontario identified in the first round were then sorted. The Hay business was found to have an overall RANK second only to the Great Western Railway when that company's data had been adjusted as explained in note 12 above.

**Figure 3: ONTARIO'S HUNDRED INDUSTRIAL LEADERS, 1870-1914
ON DIFFERENT MEASURES (by Industry Group)**



Of the 211 Ontario businesses first considered, 83 were found to have a composite rank index of better than 100th. A firm's overall RANK on the composite index was compared with its type based on the number of separate measures on which it ranked among the top 100. Generally businesses with high individual ranks topped the composite index, 22 firms that were among the top one hundred places for all four measures occupying the top 22 places on the composite index. The 60 firms which ranked among the top 100 in at least three of the variables scored among the top 67 places on the composite index. But several firms ranked among the top hundred on only two separate measures but had quite high scores on the composite index.¹³

After trying several possibilities, we determined that a business should rank among the top 100 on at least three of the four measures to be included among the group of leading industrial enterprises of Ontario in 1871 that are examined in more depth in this study.¹⁴ The sixty industrial firms which qualified on these criteria are listed with various summary data in Table 3. The enterprises are listed in order of their overall RANK on the composite index which merged rankings in the four separate variables of Capital (FIXCAP), Employment (TOTEMP), Production (PRODUCTS) and Added value (VADD). The column headed TYPE specifies each firm's combination of rankings among the top hundred in Ontario (see Table 1). The Standard Industrial Classification (SIC) for each establishment is also given; this is based on the 1970 system as adapted to provide greater specificity and also to suit some of the conditions of industrial activity in 1871.¹⁵

These sixty leading enterprises comprised only a minuscule proportion-- just over one quarter of one per cent -- of the total number of industrial establishments in 1871. But they accounted for over 15 per cent of the fixed capital investment, employed nearly 12 per cent of the industrial workers, and

¹³ These were Consumers Gas (AC), John Davis a pork packer (PA), Wiser and Eggart the distillers (PA), Kempsters the builders of Hamilton (AE), Fraser & Co's woollen mill in Cobourg (CE), James Norris the miller of St Catharines (PA), and the Hotchkiss Peckham sawmill of Collingwood (AE). We note also that the Massey Manufacturing Company, still located in Newcastle in 1871, ranked 132nd on the composite index and figures among the top hundred Ontario industrial businesses only in Added value.

¹⁴ We also considered selecting only the 37 businesses which ranked among the top 100 on all four measures; or the 83 firms with an average rank of 100 or better on composite index; or the 99 establishments with ranks among top 100 in at least two measures; or all 211 which ranked among the top hundred on any measure. We decided against choosing the "top fifty" or the "top hundred" on the composite index when we found that this would have involved separating firms which ranked very close or even equal when all measures were considered.

¹⁵ For a detailed explanation of the application of the 1970 Standard Industrial Classification to the CANIND71 database see Bloomfield and Bloomfield, Standard Industrial Classifications Applied to Historical Data: the Case of the 1871 Industrial Census, #7 in this series.

Table 3: Summary data of sixty largest industrial firms in rank order

12

PROPRIETOR	LOCATION	SIC	TYPE ESTABLISHMENT	FIXCAP	TOTEMP	SUMPROC	VADD TYPE	RANK
GREAT WESTERN RAILWAY	HAMILTON	326	RAILWAY CARS/LOCOMOTIVES	750000	630	600000	400000 PACE	1
HAY R & CO	TORONTO	261	CABINETS/UPHOLSTERY	400000	430	500000	150000 PACE	2
GRAND TRUNK RAILWAY	BRANTFORD	326	REPAIR SHOPS	435000	315	326000	244000 PACE	3
GOODERHAM & WORTS	TORONTO	109-D	STEAM MILLS/ARTILLERY	350000	150	1470000	1020000 PACE	4
HALL JOSEPH CO	OSHAWA	315-E/311	ENGINES/AGRIC IMPLEMENTS	200000	266	300000	243400 PACE	5
BRONSON WESTON & CO	OTTAWA	251	SAW MILL	350000	300	360000	120000 PACE	6
HAMILTON WILLIAM	TORONTO	315-E/326	ST LAWRENCE FOUNDRY	100000	200	620000	585000 PACE	6
HAMILTON ROLLING MILLS	HAMILTON	291-R	ROLLING MILLS	70000	225	680000	270000 PACE	8
DICKEY NEILL & CO	TORONTO	315-E/315	SOHO FOUNDRY/STEAM ENGINES	120000	230	275600	162700 PACE	9
GWOWSKI C & CO	TORONTO	291-R	ROLLING MILL	100000	200	500000	113000 PACE	10
HAMILTON BROTHERS	HAWKESBURY	251	SAW MILLS	100000	168	540000	140000 PACE	11
PERLEY & PATTEE	OTTAWA	251	SAW MILL	150000	250	330000	90000 PACE	12
CANADIAN ENGINE CO	KINGSTON	326	RAILWAY CARS/ENGINES	200000	173	306000	105012 PACE	13
ROSAMOND B & W & CO	ALMONTE	182	WOOLEN FACTORY	200000	209	350000	80000 PACE	14
GOLDIE MCCULLOCH CO	GALT	315-E/315	ENGINES/MACHINE WORKS	100000	203	180000	152300 PACE	15
BALDWYN A H	OTTAWA	251	SAW MILL	90000	274	276000	96000 PACE	16
BOOTH JAMES R	OTTAWA	251	SAW MILL	400000	200	250000	70000 PACE	17
WANZER R M & CO	HAMILTON	315-S	SEWING MACHINE FACTORY	58000	275	210000	145000 PACE	18
YOUNG LAW & CO	DUNDAS	181	DUNDAS COTTON MILLS	250000	143	200000	90000 PACE	19
GUELPH SEWING MACHINE CO	GUELPH	315-S	SEWING MACHINES	65000	180	204800	142800 PACE	20
BEATY JAMES: THE LEADER	TORONTO	289	NEWSPAPERS/BOOKS	165000	80	250000	150000 PACE	21
WALKER HIRAM	SANDWICH E TP	109-D	DISTILLER/MALTSTER	47200	106	1114982	874982 PACE	22
SANFORD MACINNES & CO	HAMILTON	242	CLOTHING MANUFACTURE	40000	455	350000	100000 PAE	22
CORNWALL MANUFACTURING CO	CORNWALL TP	182	WOOLEN FACTORY	100000	145	200000	90000 PACE	24
GORDON MCKAY	MERRITTON	181	LYBSTER COTTON MILLS	150000	200	150000	84000 PACE	25
SESSIONS/TURNER/COOPER	TORONTO	174	BOOTS & SHOES	30000	510	300000	120000 PAE	26
BARBER & BROS	TORONTO TP	182	WOOL CLOTH FACTORY	150000	129	175000	85000 PACE	27
MCPHERSON JOHN & CO	HAMILTON	174	BOOTS & SHOES	70000	175	200000	80000 PACE	28
MCDougall & Ludgate	HAMILTON TP	251	SAW MILL	152960	225	135000	67500 PACE	29
RIORDAN JOHN	MERRITTON	271	ST CATHARINES PAPER WORKS	156000	100	160000	90000 PACE	30
GILMOUR & COMPANY	TRENTON	251	SAW MILL	60000	170	220000	66000 PACE	31
ENGLEHART & CO	LONDON TP	365	PETROLEUM OIL REFINERY	50000	50	540000	280000 PAC	32
WILLIAMS JAMES & CO	BARTON TP	365	OIL REFINERY	50000	50	400000	180000 PAC	33
RANDALL FARR & CO	HESPELER	182	WORSTED/WOOLEN MILL	77000	163	200000	60000 PACE	34
GIBBS WILLIAM H	OSHAWA	261	CABINETS	60000	181	165000	65000 PACE	35
THE GLOBE PUBLISHER	TORONTO	289	PRINTER/NEWSPAPER	60000	80	220000	110000 PACE	36
TUTTLE DATE & RODDEN	ST CATHARINES	306	AGRICULTURAL HAND TOOLS	75000	120	137000	101000 PACE	37
HUNTER ROSE & CO	TORONTO	286/287-B	PRINTER/BINDERY	40000	173	160000	110000 PAE	37
ROBERTSON & COOK	TORONTO	289	PRINTER: DAILY TELEGRAPH	50000	95	200000	100000 PAC	39
MOORHEAD GEORGE	LONDON	261	CABINET MAKER	100000	68	150000	110000 PAC	40
RATHBUN H B & SON	DESERONTO	251	STEAM SAW MILL	50000	311	140754	62854 PACE	41
MCARTHUR F F	BOWMANVILLE	261	FURNITURE	50000	175	135000	85000 PACE	42
NORTHERN RAILWAY	TORONTO	326	RAILWAY CARS/LOCOMOTIVES	120000	87	134530	100000 PACE	43
DAMER KING & CO	TORONTO	174	BOOTS & SHOES	20000	191	250000	100000 PAE	43
CALVIN & BRECK	GARDEN ISLAND	031	RAFT BUILDING	32000	156	150000	127500 PAE	45
SMART JAMES	BROCKVILLE	307-S/309	STOVE/IRONWARE FACTORY	32000	160	140000	90000 PAE	46
CHILD & HAMILTON	TORONTO	174	BOOTS & SHOES	40000	192	160000	75000 PAE	47
WATEROUS C H & CO	BRANTFORD	315-E/315	BRANTFORD ENGINES WORKS	57000	118	120000	100300 ACE	48
GURNEY E & CO	HAMILTON	307-S/294	IRON FOUNDRY	20000	101	140000	94800 PAE	49
BECKETT F G & CO	HAMILTON	315-E/301	STEAM ENGINES/BOILERS	100000	120	100000	60000 ACE	50
PATTERSON BROS	VAUGHAN TP	311	AGRICULTURAL MACHINERY	50000	125	113630	82980 ACE	51
TAYLOR ISAAC B	OTTAWA	289	PRINTING: THE CITIZEN	50000	140	113797	73797 ACE	52
YOUNG LEVI	OTTAWA	251	SAW MILL	100000	100	182000	32000 PCE	53
WILSON BOWMAN & CO	HAMILTON	315-S	SEWING MACHINES	8000	131	200000	150000 PAE	54
GOODERHAM & WORTS	TORONTO TP	105	FLOUR MILL	50000	35	254000	79000 PAC	55
THOMPSON & WILLIAMS	MITCHELL	311/315-E	AGRIC IMPLS/ENGINES	25000	106	150000	100000 PAE	56
NOXON BROTHERS	INGERSOLL	311/315	FOUNDRY/AGRIC IMPLEMENTS	70000	103	111400	60900 ACE	57
BEARD BROS & CO	TORONTO	307-S	CANADIAN STOVE WORKS	2000	100	250000	203900 PAE	57
HENDERSON/BOSTWICK	TORONTO	249-H	HATS/BONNETS	50000	201	80000	55300 ACE	59
PATERSON JOHN & CO	TORONTO	174	BOOTS & SHOES	17000	154	160000	60000 PAE	60

*** Total ***

7114160 11102 16990493 9136125

produced over 14 per cent of total output and 17.6 per cent of the value added in manufacture. To provide some basis for comparison, we can now report that 71 industrial enterprises in Quebec (44 of them in Montreal alone) and nine in New Brunswick and Nova Scotia (including five in Saint John and one in Halifax) would qualify if we applied the same criteria as in Ontario.

3 PROFILE OF ONTARIO'S LARGEST FIRMS IN 1871

How representative were the largest manufacturers of all industrial activity in Ontario in 1871? Clearly they were quite untypical of the thousands of small craftshops -- the blacksmiths, tinsmiths, bakers, saddlers, shoemakers, tailors, milliners, weavers and knitters, coopers, carpenters, carriage and wagon makers -- which made up by far the majority of Ontario's establishments in 1871. These artisanal industrial activities deserve more scholarly attention but are outside our main concern in this report.

Most industrial establishments in 1871 were very small. The mean number of employees in each establishment was 4.4. Two in every five workplaces were one-worker shops and nearly 85 per cent of all establishments had five or fewer workers (Table 4). Only one third of one percent of all businesses had over 100 workers but these accounted for nearly 15 per cent of all industrial employees and 15 per cent of the total value added in manufacturing.

Table 4
Ontario industrial establishments, 1871
By firm size or numbers of employees per firm

Firm size # employees	Establishments % total	Employment % total	Production % total	Value Added % total
1	39.8	9.0	6.1	6.2
2 - 5	45.8	28.5	29.9	25.7
6 - 25	12.9	30.1	33.2	32.7
26 - 50	1.2	10.0	10.8	11.9
51 - 100	0.5	7.6	6.7	8.1
101 +	0.3	14.8	13.1	15.4
TOTALS	100.0	100.0	100.0	100.0

The great majority of firms were small in terms of output as well. The mean value of production per establishment was \$5,516, but four in every five businesses had lower values. Over one quarter of all firms had an output of no more than \$500. Conversely, under two per cent of all firms produced more than \$50,000 worth of products though these few accounted for large proportions of total employment, value of industrial production and value added (Table 5).

Table 5
Ontario industrial establishments, 1871
By output size classes

Size class by value of output	Establishments % total	Employment % total	Production % total	Value Added % total
\$ 1 - 500	26.3	9.5	1.6	1.4
\$ 501 - 2500	44.2	20.9	9.1	12.4
\$ 2501 - 5000	11.3	10.6	6.9	8.7
\$ 5001 - 10000	7.8	11.2	9.5	10.6
\$ 10001 - 25000	6.1	14.5	16.4	15.9
\$ 25001 - 50000	2.4	9.7	14.5	12.6
\$ 50001 - 100000	1.1	7.5	12.9	10.8
\$ 100001 & over	0.8	15.9	29.4	27.5
TOTALS	100.0	100.0	100.0	100.0

The largest Ontario firms in 1871 may be considered as to their representativeness of industrial sectors, their patterns of location, ownership and organization, their use of power technology and their work environments. We can only begin to address the following questions here, but there is scope for deeper research. To what extent were the largest firms dominated by the processing of agricultural and forest staples or did they represent the full range of types of industry? Were they distributed throughout the province or concentrated spatially in Central Ontario around Toronto? How were these businesses owned and organized in 1871? To what extent did they use inanimate power, especially steam engines? Were the largest mills and factories more or less productive than smaller industrial units? How did these firms compare in scale of operation with large firms elsewhere in the same period?

Evaluation of the Manuscript Census Evidence for Ontario's Largest Firms

The sixty industrial leaders in 1871 included a remarkably wide range of types of industrial activity. Ten businesses were associated with the lumber trade -- nine saw mills and a raft-building and forwarding operation at Garden Island at the outlet of Lake Ontario into the St Lawrence River near Kingston. The saw mills were all east of Toronto, five in Ottawa around the Chaudiere Falls, and one each in Hawkesbury, Deseronto, Trenton, and Hamilton Township. The food and drink sector was represented by the large distilleries of Gooderham and Worts in Toronto and Hiram Walker at Walkerville in Essex County and by one flour mill owned by Gooderham and Worts at Meadowvale in Peel County to the west of Toronto.

There were also five boot and shoe factories in Toronto and Hamilton, two cotton mills (in Dundas and Merritton) and four woolen mills (in Streetsville, Almonte, Hespeler and Cornwall). The clothing sector was represented by a Hamilton firm making ready-to-wear clothing in Hamilton and by a Toronto fancy goods and millinery establishment specializing in straw hats. Four cabinet/furniture factories (in Toronto, Oshawa, Bowmanville and London, a paper mill in Merritton, five printers and publishers (four in Toronto and one in Ottawa), and two oil refineries were also identified among the leading industrial firms.

Ontario's largest industrial enterprises included 22 firms in the general range of "metal trades" of metal-working, machinery and engineering. These extended from primary metal-working in the two rolling mills (Toronto and Hamilton) through metal fabricating (agricultural hand tools in St Catharines and stoves in Toronto, Hamilton and Brockville), to machinery and transportation equipment. The machinery sector included agricultural implements in Ingersoll, Mitchell and Vaughan Township (in York County northern of Toronto); engines, boilers and other machinery in Brantford, Galt, Hamilton, Toronto and Oshawa; and sewing machines in Hamilton and Guelph. The making and repair of transportation equipment was represented in the locomotive and railway car shops in Kingston, Toronto, Hamilton and Brantford.

First, we address the questions of the amount and quality of the information provided for the sixty selected businesses in the census manuscripts. The manuscript schedules and the CANIND71 database that has been created from them are described and assessed in detail in another report in this series.¹⁶ Figures 7 to 13, summarizing the CANIND71 data for ten different enterprises identified among the largest in Ontario, are good illustrations of the range of variables that might have been recorded for any of the individual firms that were enumerated in 1871. (The opening note to the Appendix explains the variable names used in the database and in several tables in this report). Standard items of information are the name and type of business and its proprietor, its location in terms of the geographical units used in the census, details of the use of non-manual forms of power, numbers of workers, and the dollar amounts of fixed and floating capital invested, wages, raw materials and production. There was space for naming the kinds, quantities, units of measurement and values of individual raw materials (inputs) or products (outputs) and for additional remarks or comments, though only a minority of records have much detail of this sort.

How well did the census enumerators describe the industrial firms in our group? We comment elsewhere on the general incidence of missing firms or of missing data for the main numeric variables.¹⁷ For the basic data of numbers employed, value of fixed capital, horse power units of inanimate motive power,

¹⁶ Elizabeth Bloomfield and G.T. Bloomfield, Creating CANIND71: Procedures for Making the 1871 Industrial Census Machine-Readable, #4 in this series. See especially pp. 34-52 for a critique of several variables and the incidence of missing data.

¹⁷ Creating CANIND71, 44-47.

Figure 4:
CANIND71 SAMPLE RECORD

<i>proprietor:</i> C.H. WATEROUS & COMPANY	<i>typeest:</i> ENGINES AND MACHINERY		
<i>cdid:</i> 0015	<i>ced:</i> D-2	<i>cdistrict:</i> BRANT SOUTH	<i>csd:</i> BRANTFORD T
<i>sic:</i> 315-E/315	<i>sec:</i> 5.14	<i>month:</i> 12	<i>type:</i> U
<i>fixcap:</i> 57000	<i>flocap:</i> 50000	<i>typepow:</i> STEAM	<i>force:</i> 40
<i>empmen:</i> 118	<i>empwom:</i>	<i>empboy:</i>	<i>empgirl:</i>
<i>totemp:</i> 118	<i>wages:</i> 40573	<i>avwage:</i> 28.66 per worker/month	
<i>sumrawc:</i> 19700	<i>sumproc:</i> 120000	<i>vadd:</i> 100300	
<i>rawmat1:</i> PIG IRON	<i>runit1:</i> TON	<i>rquant1:</i> 220	<i>rvalue1:</i>
<i>rawmat2:</i> BAR IRON	<i>runit2:</i> TON	<i>rquant1:</i> 100	<i>rvalue2:</i>
<i>rawmat3:</i> STEEL	<i>runit3:</i> TON	<i>rquant3:</i> 4	<i>rvalue3:</i>
<i>rawmat4:</i> BOILER PLATE	<i>runit4:</i> TON	<i>rquant4:</i> 50	<i>rvalue4:</i>
<i>rawmat5:</i> SHEET IRON	<i>runit5:</i> TON	<i>rquant5:</i> 12	<i>rvalue5:</i>
<i>rawmat6:</i> ASSORTED LUMBER	<i>runit6:</i>	<i>rquant6:</i>	<i>rvalue7:</i>
<i>rawmat7:</i> BOILER TUBES	<i>runit7:</i>	<i>rquant7:</i>	<i>rvalue7:</i>
<i>rawmat8:</i>	<i>runit8:</i>	<i>rquant8:</i>	<i>rvalue8:</i>
<i>rawmat9:</i>	<i>runit9:</i>	<i>rquant9:</i>	<i>rvalue9:</i>
<i>rawmat10:</i>	<i>runit10:</i>	<i>rquant10:</i>	<i>rvalue10:</i>
<i>rawmat11:</i>	<i>runit11:</i>	<i>rquant11:</i>	<i>rvalue11:</i>
<i>rawmat12:</i>	<i>runit12:</i>	<i>rquant12:</i>	<i>rvalue12:</i>
<i>prod1:</i> MACHINERY, ASSORTED	<i>punit1:</i> TON	<i>pquant1:</i> 175	<i>pvalue1:</i> 120000
<i>prod2:</i>	<i>punit2:</i>	<i>pquant1:</i>	<i>pvalue2:</i>
<i>prod3:</i>	<i>punit3:</i>	<i>pquant3:</i>	<i>pvalue3:</i>
<i>prod4:</i>	<i>punit4:</i>	<i>pquant4:</i>	<i>pvalue4:</i>
<i>prod5:</i>	<i>punit5:</i>	<i>pquant5:</i>	<i>pvalue5:</i>
<i>prod6:</i>	<i>punit6:</i>	<i>pquant6:</i>	<i>pvalue7:</i>
<i>prod7:</i>	<i>punit7:</i>	<i>pquant7:</i>	<i>pvalue7:</i>
<i>prod8:</i>	<i>punit8:</i>	<i>rquant8:</i>	<i>pvalue8:</i>
<i>prod9:</i>	<i>punit9:</i>	<i>pquant9:</i>	<i>pvalue9:</i>
<i>prod10:</i>	<i>punit10:</i>	<i>pquant10:</i>	<i>pvalue10:</i>
<i>prod11:</i>	<i>punit11:</i>	<i>pquant11:</i>	<i>pvalue11:</i>
<i>prod12:</i>	<i>punit12:</i>	<i>pquant12:</i>	<i>pvalue12:</i>
<i>comments:</i> STEAM ENGINES; BOILERS; GRIST MILL AND SAW MILL MACHINERY; SHINGLE AND LATHE MACHINES; ROTARY FORCE PUMPS; WATEROUS IMPROVED SYSTEM OF FIRE PROTECTION AND WATER SUPPLY FOR CITIES, TOWNS AND VILLAGES.			

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SAW GUMMERS,
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WRENCHES,
FILES,
BELTING,
BELT STUDS,
And all kinds of
SAW MILLS,
SHINGLE,
LATH AND
STAVE
MACHINES,
DOUBLE AND
SINGLE EDGERS,
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CHOPPING
MILLS, &c., &c.

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The above Mill is similar to that exhibited by us at the last Provincial Exhibition, in London, Ontario, (see cut on next page,) where it was awarded first prize and diploma. We would also refer to the following parties, who are running the same kind of mill:

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NASH, Farmersville, Ont.; CHASE & GRIGGS, Sutton Flatts, Que.; CANFIELD & MURRAY, Kingsville, Ont.; THOS. MOWBRAY,
Utterson, Muskoka, Ont.; C. E. PETTES, West Bronte, P.Q.; R. & C. E. CURRIE, Richmond, Carleton, Co., N.B.

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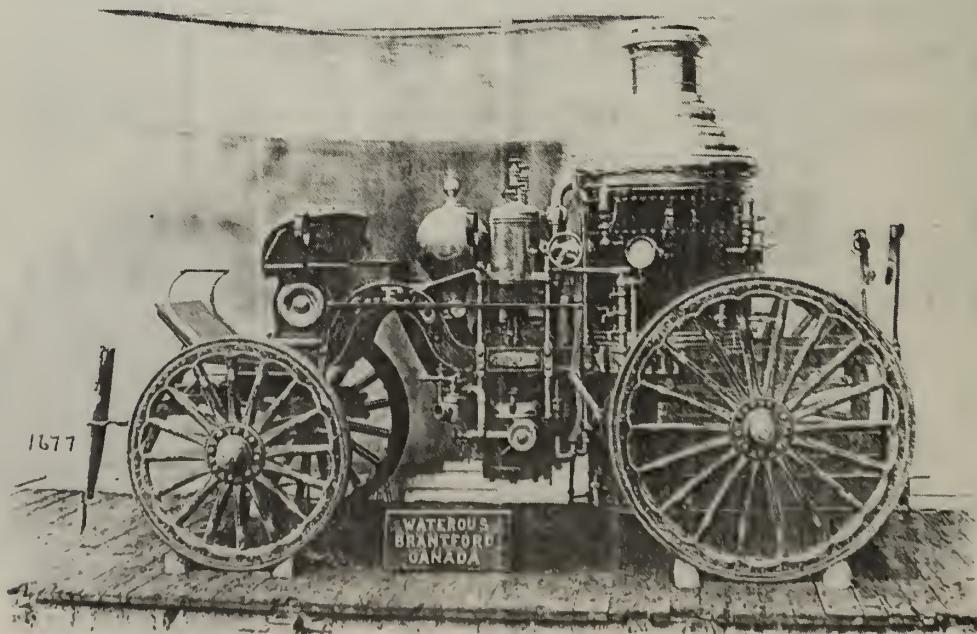
C. H. WATEROUS & CO.,
BRANTFORD, ONT.





Figure 6: Plant of Waterous Engine Works, Colborne Street, Brantford. Source: company photo.

Figure 7: Engine produced by Waterous firm, c1871. Source: company photo.



and aggregate values of raw materials and production the percentage of missing data or missing records is very small.¹⁸ But the quality of some of the descriptive information is sometimes rather flawed and the records vary enormously in the amount of detail for raw materials and products.

In the first case it is possible to supplement the census manuscripts with information from contemporary directories such as Lovell's 1871 Province of Ontario Directory or from the R.G. Dun reference books of credit ratings for 1871. A discrepancy can sometimes be observed between the name of the proprietor or business as recorded by the census enumerator and as listed in either of the printed volumes. The business known to directories as the Welland Vale works in St Catharines, for example, is recorded in the census as run by partners Duttle, Dale and Rodden, with two of these names mis-spelled as Tuttle and Date (Figure 18). Various other businesses are listed by the personal names of their managers or proprietors when they had other business names. James Smart's firm was usually known as the Brockville Novelty Works. John Riordan's paper mill at Merritton was listed in directories as the St Catharines Paper Works. The firm recorded in the census as Young Law & Company was also known as the Dundas Cotton Mills (Figure 12).

The difference in name can be quite substantial and misleading, especially considering that the three sources were compiled concurrently. A large furniture factory headed by "F.F. McArthur, president" according to the census, was the same as the Bowmanville Furniture Manufacturing Company whose manager was Thomas Johnston, in the directory listing. "John Warwick's woolen factory", reported in the remarks on the census schedule to have burned down on Christmas Day 1870, was the same as the Cornwall Manufacturing Company, owned by Montreal investors including Hugh Allan as president and George Stephen as vice-president, while John Warwick was the factory's manager. Very occasionally the census enumerator used a corporate title while directories refer to the personal names of the business partners. The Guelph Sewing Machine Company, for example, was more commonly known by the names of its partners Keables, Osborne and Wilkie. From the directories we can also obtain more exact addresses of the firms, especially within towns and cities, that help in tracing their subsequent history.

The detail with which the types and quantities of raw materials and products were reported varied enormously. The 1871 census schedules allowed space for enumerators to complete details of the quantities as well as the

¹⁸ The quality of the data for the sixty selected enterprises is a little better than the average for the entire database. Some aberrations may be noted in addition to the points made in the text following. The record for the Globe publishing establishment omits any type of power, yet the Globe acquired a steam-powered cylinder press in 1844, the first publishing company to do so in Canada West. So its use of steam power should be roughly similar to that of the other printers. Similarly, it is hard to believe that Calvin & Breck's enterprise at Garden Island used no inanimate power for its ship-building operations. Among larger businesses, definitely operating in 1871, that seem to have been missed by the census enumerators was the Hamilton waterworks which was located outside the city in Saltfleet Township.

dollar values of raw materials and of manufactured products. But the census organizers anticipated problems with the returns for this kind of information, stating in the "Instructions to Officers" that "in many instances the raw materials or articles manufactured are of such a multifarious character that they must be lumped together and entered by the value".¹⁹ Significantly, the columns for values of raw materials and values of products are headed "Aggregate value". The census enumerators handled this part of the industrial schedule more variably than any other. Some made considerable efforts to ascertain and record the types, quantities, units of measurement and values of component raw materials and manufactured products, and set these out systematically and clearly. Others simply named one or several materials or products but did not specify separate quantities or values.

In the vast majority of the records in the CANIND71 database, details for raw materials could be fitted into one set of fields, as could details for products. Only in 4.5 per cent of Maritime establishments, 4.9 per cent of those in Quebec and 6.5 per cent of those in Ontario were more than two sets of fields required for recording details of products or raw materials. The proportion of records in which enumerators provided considerable detail of inputs and outputs was even smaller. Altogether, less than one per cent of all the records in the CANIND71 database list at least three products **and** three raw materials together with some details of quantities and component values. And for only 35 establishments in all four provinces are at least five raw materials **and** five products listed with their quantities in the 1871 manuscript census schedules. Generally it seems that the raw materials and products of simple rural industrial businesses are relatively better described than those of larger and more complex enterprises in urban centres.

How good are the details of component raw materials and products for the sixty largest firms in Ontario? Data for raw materials and products are rather better for the selected firms than for Canadian industrial businesses generally in that 10 per cent of the large businesses had at least three raw materials and at least three products specified in detail. However, for over half the firms (37 of the 60), it was possible to fit all the available information into one set of fields for each of raw materials and products. Characteristic is the entry for Robert Hay and Company of Toronto, by far the largest business making cabinets and upholstery in Ontario with production valued at \$500,000 in 1871. This record specified for materials only "140,000 ft lumber" worth \$350,000 and for products "cabinet ware of all kinds" valued at \$500,000. Another example is the Gooderham and Worts distillery that used 600,000 bushels of corn, rye, oats and barley worth \$450,000 to make 2,100,000 gallons of spirits. The Rosamond woolen factory at Almonte reported 900,000 lbs of wool worth \$270,000 used to make 360,000 yards of woolen goods worth \$350,000. Not all of these simple reports were even as specific as these examples. Damer King & Company of Toronto reported only that its shoe factory used \$150,000 worth of leather to make \$250,000 worth of boots and shoes, with no statement of quantities or units of measurement from which we might derive unit costs.

¹⁹ "Manual", Canada Sessional Papers (1871): 139.

Figure 8

CANIND71 SAMPLE RECORD

proprietor: PERLEY & PATTEE **typeest:** SAW MILL
cdid: O077 **ced:** B-2 **cdistrict:** OTTAWA **csd:** VICTORIA WARD
sic: 251 **sec:** 5.08 **month:** 6 **type:** U
fixcap: 150000 **flocap:** 300000 **typepow:** WATER **force:** 500
empmen: 250 **empwom:** **empboy:** **empgirl:**
totemp: 250 **wages:** 70000 **avwage:** 46.67 per worker/month
sumrawc: 240000 **sumproc:** 330000 **vadd:** 90000
rawmat1: LOGS **runit1:** **rquant1:** 150000 **rvalue1:** 240000
rawmat2: **runit2:** **rquant1:** **rvalue2:**
prod1: LUMBER **punit1:** FT BM **pquant1:** 30000 **pvalue1:** 330000
prod2: **punit2:** **pquant1:** **pvalue2:**
comments:

CANIND71 SAMPLE RECORD

proprietor: GOODERHAM & WORTS **typeest:** FLOUR MILL
cdid: O039 **ced:** A-3 **cdistrict:** PEEL **csd:** TORONTO TOWNSHIP
sic: 105 **sec:** 5.01 **month:** 12 **type:**
fixcap: 50000 **flocap:** 100000 **typepow:** WATER **force:** 80
empmen: 35 **empwom:** **empboy:** **empgirl:**
totemp: 35 **wages:** 16000 **avwage:** 38.08 per worker/month
sumrawc: 175000 **sumproc:** 254000 **vadd:** 79000
rawmat1: WHEAT **runit1:** BU **rquant1:** 180000 **rvalue1:** 175000
rawmat2: **runit2:** **rquant1:** **rvalue2:**
prod1: FLOUR **punit1:** BBL **pquant1:** 40000 **pvalue1:** 250000
prod2: BRAN/SHORTS **punit2:** **pquant1:** **pvalue2:** 4000
comments:

Figure 9

CANIND71 SAMPLE RECORD

proprietor: JAMES WILLIAMS & CO **typeest:** CANADIAN OIL COMPANY LTD
cdid: 0022 **ced:** C-1 **cdistrict:** WENTWORTH SOUTH **csd:** BARTON
sic: 365 **sec:** 5.18 **month:** 12 **type:**
fixcap: 50000 **flocap:** 50000 **typepow:** STEAM **force:** 50
empmen: 35 **empwom:** **empboy:** 15 **empgirl:**
totemp: 50 **wages:** 20000 **avwage:** 33.34 per worker/month
sumrawc: 220000 **sumproc:** 400000 **vadd:** 180000
rawmat1: PETROLEUM **runit1:** BBL **rquant1:** 60000 **rvalue1:** 120000
rawmat2: BARRELS **runit2:** **rquant1:** **rvalue2:** 100000
prod1: RFINED PETROLEUM **punit1:** BBL **pquant1:** 50000 **pvalue1:** 400000
prod2: **punit2:** **pquant1:** **pvalue2:**
comments:

CANIND71 SAMPLE RECORD

proprietor: JOHN PATERSON & CO **typeest:** BOOT & SHOE MANUFACTORY
cdid: 0047 **ced:** B-1 **cdistrict:** TORONTO EAST **csd:** ST JAMES WARD
sic: 174 **sec:** 5.04 **month:** 12 **type:** U
fixcap: 17000 **flocap:** 15000 **typepow:** **force:**
empmen: 100 **empwom:** 50 **empboy:** 4 **empgirl:**
totemp: 154 **wages:** 31200 **avwage:** 16.88 per worker/month
sumrawc: 100000 **sumproc:** 160000 **vadd:** 60000
rawmat1: LEATHER/COTTON,LINEN,WOOL/PEGS/SHOE NAILS/THREAD **rvalue1:** 100000
rawmat2: **runit2:** **rquant1:** **rvalue2:**
prod1: BOOTS & SHOES **punit1:** PR **pquant1:** 100000 **pvalue1:** 160000
prod2: **punit2:** **pquant1:** **pvalue2:**
comments: THOMAS MURPHY, H. BRAID & S. NORRIS; CAN'T GIVE QUANTITIES

Figure 10

CANIND71 SAMPLE RECORD

proprietor: HUNTER ROSE & CO **typeest:** PRINTER/BINDERY
cdid: 0046 **ced:** B-1 **cdistrict:** TORONTO WEST **csd:** ST ANDREW WARD
sic: 286/287-B **sec:** 5.11 **month:** 12 **type:** U
fixcap: 40000 **flocap:** 60000 **typepow:** STEAM **force:** 25
empmen: 70 **empwom:** 100 **empboy:** 3 **empgirl:**
totemp: 173 **wages:** 48000 **avwage:** 23.12 per worker/month
sumrawc: 50000 **sumproc:** 160000 **vadd:** 110000
rawmat1: PAPER/LEATHER **runit1:** **rquant1:** **rvalue1:** 50000
rawmat2: **runit2:** **rquant1:** **rvalue2:**
prod1: BOOKS/PRINTED MATTER **punit1:** **pquant1:** **pvalue1:** 160000
prod2: **punit2:** **pquant1:** **pvalue2:**
comments: GOVERNMENT WORK; DOES NOT MANUFACTURE

CANIND71 SAMPLE RECORD

proprietor: WILSON BOWMAN & CO **typeest:** SEWING MACHINE MANUFACTORY
cdid: 0024 **ced:** A-1 **cdistrict:** HAMILTON **csd:** ST GEORGE WARD
sic: 315-E **sec:** 5.14 **month:** 12 **type:** U
fixcap: 8000 **flocap:** 40000 **typepow:** STEAM **force:** 15
empmen: 90 **empwom:** 1 **empboy:** 40 **empgirl:**
totemp: 131 **wages:** 29500 **avwage:** 18.91 per worker/month
sumrawc: 50000 **sumproc:** 200000 **vadd:** 150000
rawmat1: IRON CASTINGS/STEEL/BRASS/CABINET WORK **rvalue1:** 175000
rawmat2: **runit2:** **rquant1:** **rvalue2:**
prod1: SEWING MACHINES **punit1:** **pquant1:** 15000 **pvalue1:** 200000
prod2: **punit2:** **pquant1:** **pvalue2:**
comments:

Figure 11

CANIND71 SAMPLE RECORD

<i>proprietor:</i> PATTERSON BROTHERS	<i>typeest:</i> AGRICULTURAL MACHINERY WORKS		
<i>cdid:</i> 0044	<i>ced:</i> B-2	<i>cdistrict:</i> YORK WEST	<i>csd:</i> VAUGHAN TOWNSHIP
<i>sic:</i> 311	<i>sec:</i> 5.14	<i>month:</i> 12	<i>type:</i>
<i>fixcap:</i> 50000	<i>flocap:</i> 50000	<i>typepow:</i> W/S	<i>force:</i> 30
<i>empmen:</i> 125	<i>empwom:</i>	<i>empboy:</i>	<i>empgirl:</i>
<i>totemp:</i> 125	<i>wages:</i> 50000	<i>avwage:</i> 33.34 (worker/month)	
<i>sumrawc:</i> 30650	<i>sumproc:</i> 113630	<i>vadd:</i> 83000	
<i>rawmat1:</i> COAL	<i>runit1:</i> TON	<i>rquant1:</i> 250	<i>rvalue1:</i> 2750
<i>rawmat2:</i> IRON	<i>runit2:</i> TON	<i>rquant2:</i> 650	<i>rvalue2:</i> 15400
<i>rawmat3:</i> STEEL	<i>runit3:</i>	<i>rquant3:</i>	<i>rvalue3:</i> 5000
<i>rawmat4:</i> LUMBER	<i>runit4:</i>	<i>rquant4:</i> 40000	<i>rvalue4:</i> 6000
<i>rawmat5:</i> PAINT/OIL	<i>runit5:</i>	<i>rquant5:</i>	<i>rvalue5:</i>
<i>rawmat6:</i>	<i>runit6:</i>	<i>rquant6:</i>	<i>rvalue6:</i>
<i>rawmat7:</i>	<i>runit7:</i>	<i>rquant7:</i>	<i>rvalue7:</i>
<i>rawmat8:</i>	<i>runit8:</i>	<i>rquant8:</i>	<i>rvalue8:</i>
<i>rawmat9:</i>	<i>runit9:</i>	<i>rquant9:</i>	<i>rvalue9:</i>
<i>rawmat10:</i>	<i>runit10:</i>	<i>rquant10:</i>	<i>rvalue10:</i>
<i>rawmat11:</i>	<i>runit11:</i>	<i>rquant11:</i>	<i>rvalue11:</i>
<i>rawmat12:</i>	<i>runit12:</i>	<i>rquant12:</i>	<i>rvalue12:</i>
<i>prod1:</i> REAPERS	<i>punit1:</i>	<i>pquant1:</i> 421	<i>pvalue1:</i> 60130
<i>prod2:</i> MOWERS	<i>punit2:</i>	<i>pquant2:</i> 300	<i>pvalue2:</i> 27000
<i>prod3:</i> PLOUGHES	<i>punit3:</i>	<i>pquant3:</i> 600	<i>pvalue3:</i> 10000
<i>prod4:</i> CULTIVATORS	<i>punit4:</i>	<i>pquant4:</i> 50	<i>pvalue4:</i> 1500
<i>prod5:</i> FANNING MILLS	<i>punit5:</i>	<i>pquant5:</i> 250	<i>pvalue5:</i> 6250
<i>prod6:</i> STRAW CUTTERS	<i>punit6:</i>	<i>pquant6:</i> 350	<i>pvalue6:</i> 8750
<i>prod7:</i>	<i>punit7:</i>	<i>pquant7:</i>	<i>pvalue7:</i>
<i>prod8:</i>	<i>punit8:</i>	<i>rquant8:</i>	<i>pvalue8:</i>
<i>prod9:</i>	<i>punit9:</i>	<i>pquant9:</i>	<i>pvalue9:</i>
<i>prod10:</i>	<i>punit10:</i>	<i>pquant10:</i>	<i>pvalue10:</i>
<i>prod11:</i>	<i>punit11:</i>	<i>pquant11:</i>	<i>pvalue11:</i>
<i>prod12:</i>	<i>punit12:</i>	<i>pquant12:</i>	<i>pvalue12:</i>

comments: **WATER AND STEAM 15 HORSE POWER EACH**

Figure 12

CANIND71 SAMPLE RECORD

proprietor: YOUNG LAW & COMPANY **typeest:** COTTON FACTORY
cdid: O023 **ced:** C-2 **cdistrict:** WENTWORTH NORTH **csd:** DUNDAS T
sic: 181 **sec:** 5.05 **month:** 12 **type:** U
fixcap: 250000 **flocap:** 50000 **typepow:** WATER/STEAM **force:** 90
empmen: 30 **empwom:** 66 **empboy:** 16 **empgirl:** 31
totemp: 143 **wages:** 29500 **avwage:** 17.19 per worker/month
sumrawc: 110000 **sumproc:** 200000 **vadd:** 90000
rawmat1: COTTON **runit1:** LB **rquant1:** 600000 **rvalue1:** 110000
rawmat2: **runit2:** **rquant2:** **rvalue2:**
rawmat3: **runit3:** **rquant3:** **rvalue3:**
rawmat4: **runit4:** **rquant4:** **rvalue4:**
rawmat5: **runit5:** **rquant5:** **rvalue5:**
rawmat6: **runit6:** **rquant6:** **rvalue6:**
rawmat7: **runit7:** **rquant7:** **rvalue7:**
rawmat8: **runit8:** **rquant8:** **rvalue8:**
rawmat9: **runit9:** **rquant9:** **rvalue9:**
rawmat10: **runit10:** **rquant10:** **rvalue10:**
rawmat11: **runit11:** **rquant11:** **rvalue11:**
rawmat12: **runit12:** **rquant12:** **rvalue12:**
prod1: GREY COTTON **punit1:** YD **pquant1:** 1000000 **pvalue1:** 120000
prod2: SEAMLESS BAGS **punit2:** **pquant2:** 86000 **pvalue2:** 30000
prod3: YARN **punit3:** LB **pquant3:** 150000 **pvalue3:** 50000
prod4: **punit4:** **pquant4:** **pvalue4:**
prod5: **punit5:** **pquant5:** **pvalue5:**
prod6: **punit6:** **pquant6:** **pvalue6:**
prod7: **punit7:** **pquant7:** **pvalue7:**
prod8: **punit8:** **rquant8:** **pvalue8:**
prod9: **punit9:** **pquant9:** **pvalue9:**
prod10: **punit10:** **pquant10:** **pvalue10:**
prod11: **punit11:** **pquant11:** **pvalue11:**
prod12: **punit12:** **pquant12:** **pvalue12:**
comments: DOMICILED ELSEWHERE

Figure 13

CANIND71 SAMPLE RECORD

<i>proprietor:</i> HENDERSON & BOSTWICK	<i>typeest:</i> HAT & BONNET MANUFACTORY		
<i>cdid:</i> 0046	<i>ced:</i> A-1	<i>cdistric:</i> TORONTO WEST	<i>csd:</i> ST GEORGE WARD
<i>sic:</i> 249	<i>sec:</i> 5.07	<i>month:</i> 11	<i>type:</i> U
<i>fixcap:</i> 50000	<i>flocap:</i> 20000	<i>typepow:</i> STEAM	<i>force:</i> 15
<i>empmen:</i> 12	<i>empwom:</i> 175	<i>empboy:</i> 14	<i>empgirl:</i>
<i>totemp:</i> 201	<i>wages:</i> 14400	<i>avwage:</i> 6.51 per worker/month	
<i>sumrawc:</i> 24700	<i>sumproc:</i> 80000	<i>vadd:</i> 53000	
<i>rawmat1:</i> STRAW	<i>runit1:</i> BALE	<i>rquant1:</i> 100	<i>rvalue1:</i> 7500
<i>rawmat2:</i> CLOTH	<i>runit2:</i> PIECE	<i>rquant2:</i> 500	<i>rvalue2:</i> 4000
<i>rawmat3:</i> BUCKRAM	<i>runit3:</i> PIECE	<i>rquant3:</i> 3000	<i>rvalue3:</i> 6000
<i>rawmat4:</i> VELVETEEN	<i>runit4:</i> PIECE	<i>rquant4:</i> 400	<i>rvalue4:</i> 7200
<i>rawmat5:</i>	<i>runit5:</i>	<i>rquant5:</i>	<i>rvalue5:</i>
<i>rawmat6:</i>	<i>runit6:</i>	<i>rquant6:</i>	<i>rvalue6:</i>
<i>rawmat7:</i>	<i>runit7:</i>	<i>rquant7:</i>	<i>rvalue7:</i>
<i>rawmat8:</i>	<i>runit8:</i>	<i>rquant8:</i>	<i>rvalue8:</i>
<i>rawmat9:</i>	<i>runit9:</i>	<i>rquant9:</i>	<i>rvalue9:</i>
<i>rawmat10:</i>	<i>runit10:</i>	<i>rquant10:</i>	<i>rvalue10:</i>
<i>rawmat11:</i>	<i>runit11:</i>	<i>rquant11:</i>	<i>rvalue11:</i>
<i>rawmat12:</i>	<i>runit12:</i>	<i>rquant12:</i>	<i>rvalue12:</i>
<i>prod1:</i> HATS AND BONNETS	<i>punit1:</i> DOZ	<i>pquant1:</i> 20000	<i>pvalue1:</i> 80000
<i>prod2:</i>	<i>punit2:</i>	<i>pquant2:</i>	<i>pvalue2:</i>
<i>prod3:</i>	<i>punit3:</i>	<i>pquant3:</i>	<i>pvalue3:</i>
<i>prod4:</i>	<i>punit4:</i>	<i>pquant4:</i>	<i>pvalue4:</i>
<i>prod5:</i>	<i>punit5:</i>	<i>pquant5:</i>	<i>pvalue5:</i>
<i>prod6:</i>	<i>punit6:</i>	<i>pquant6:</i>	<i>pvalue6:</i>
<i>prod7:</i>	<i>punit7:</i>	<i>pquant7:</i>	<i>pvalue7:</i>
<i>prod8:</i>	<i>punit8:</i>	<i>rquant8:</i>	<i>pvalue8:</i>
<i>prod9:</i>	<i>punit9:</i>	<i>pquant9:</i>	<i>pvalue9:</i>
<i>prod10:</i>	<i>punit10:</i>	<i>pquant10:</i>	<i>pvalue10:</i>
<i>prod11:</i>	<i>punit11:</i>	<i>pquant11:</i>	<i>pvalue11:</i>
<i>prod12:</i>	<i>punit12:</i>	<i>pquant12:</i>	<i>pvalue12:</i>
<i>comments:</i>			

In some of these simply reported cases, however, the list of raw materials or products provides a glimpse of the current technology and markets for particular commodities. The raw materials of John Riordan's paper mills at Merriton were given as 4000 tons of grass, straw, rags, old rope, soda ash and chloride of lime, from which 1100 tons of printing and wrapping were manufactured. The agricultural and engine works of Thompson and Williams in Mitchell used unspecified quantities of pig iron, bar iron, malleable iron, steel, brass, babbitt and coal (altogether costing \$50,000) to make \$150,000 worth of steam engines and machinery for grist, saw, lath and shingle mills. Englehart & Company of London Township used 125,000 barrels of crude oil costing \$225,000 and 45,000 carboys of paint and chemicals costing \$35,000 to make 90000 barrels of refined burning oil valued at \$540,000. Examples of such simple statements of inputs and outputs are provided in Figures 8, 9 and 10 for varied types of industrial business.

The best detail of raw materials and products for any of our selected group of large firms is available for those in the metal smelting and fabricating, machinery and transportation group. The Grand Trunk Railway repair shops in Brantford reported using 565 tons of iron costing \$45,000 and 95 tons of steel costing \$15,000 to make \$130,000 worth of repairs on 28 engines and \$196,000 worth of repairs on 560 railway cars. The Patterson Brothers agricultural machinery works in Vaughan Township just north of Toronto reported using 250 tons of coal costing \$2,750, 650 tons of iron costing \$15,400, as well as steel, lumber, paint and oil to make 421 reapers, 300 mowers, 600 ploughs, 50 cultivators, 250 fanning mills and 350 straw cutters, with values specified for each of these (Figure 11). Information for the Canadian Engine Company of Kingston, the Beard Brothers Canadian Stove Works of Toronto, William Hamilton's St Lawrence Foundry in Toronto, the Noxon Brothers agricultural machinery works in Ingersoll and James Smart's Novelty Works in Brockville that made stoves and other metal products is similarly detailed for both raw materials and products.

For some other businesses, again mainly in the metals-machinery range, there is good detail for either raw materials or products with the other stated only as a list with an aggregate value. Examples are the Dickey Neill Company's Soho Foundry and Casimir Gzowski's rolling mill in Toronto; the Hamilton Rolling Mills and the Gurneys' foundry and stove works in Hamilton; Goldie and McCulloch's engine and machine works of Galt; the Waterous engine works of Brantford (Figure 7); and Joseph Hall's engine and machinery works in Oshawa. The same pattern is true of the Young Law cotton mill in Dundas (Figure 12), Henderson & Bostwick's hat and bonnet manufactory in Toronto (Figure 13) and Rathbun's steam saw mill at Deseronto.

Why do the census schedules provide more specific information for businesses in the metal-working and machinery sectors than for firms in other sectors? One reason is probably that individual businesses of this type usually had a greater diversity of products than other firms. Entrepreneurs in this broad sector were very likely to diversify their range of activities and products, so that enterprises that styled themselves foundries usually made

some combination of stoves, engines, boilers and farm machinery.²⁰ While the Joseph Hall Iron Works of Oshawa was chiefly noted for engines and boilers, it also produced mill machinery, printing presses, turbine waterwheels and farm implements (Figure 17). Goldie and McCulloch of Galt styled themselves "Founders, Engineers and Machinists, Manufacturers of Engines and Boilers and Improved Water Wheels." For firms in the metal trades, there was a greater variety of products to record, and often of raw materials as well.

Another reason for the greater detail of inputs and output for metal-working and machinery firms is that such enterprises had to keep better accounting and stock records of the commodities they handled. Such firms as the Canadian Engine Company had to itemize their costs very particularly in bidding for contracts to deliver engines or other machinery. Job numbers were entered in work books and stock room records tracked the supplies and uses of raw materials. When questioned by the census enumerators on the quantities and costs of their raw materials and products, proprietors had more records they could consult for specific details than, say, a flour mill or a saw mill.

Range of Industrial Types

In addition to the information transcribed and coded from the manuscript census into the CANIND71 database, we assigned Standard Industrial Classification codes to each enterprise on the basis of what were declared to be their main activities and products²¹. In assigning the SIC codes, we found that the "type of establishment" as stated by the census enumerator had to be supplemented by the information of raw materials and products. This was especially true of firms in the "metal trades" which were often simply described as foundries even if their products were stoves, agricultural machinery or steam engines. Metal-working enterprises frequently combined several kinds of products, so their SIC codes are often compounded of two separate codes; they may also have suffixes to provide greater specificity. The more detailed SIC codes are grouped in the major industry groups that are used in various tables in this report (Tables 2, 4 and 6, for example).

As Table 6 shows, the sixty largest industrial enterprises represent almost all major industry groups in Ontario. The moderating effect of using a composite index is also apparent. But some industry groups, which qualify when single measures are used, are not represented at all in the final list. Industry types not represented among our sixty identified businesses are tobacco, non-metallic minerals, chemicals, construction and utilities.

²⁰ The foundry businesses of Hamilton are discussed in J.C. Weaver, "The Location of Manufacturing Enterprises: the Case of Hamilton's Attraction of Foundries," in Critical Issues in the History of Canadian Science, Technology and Medicine edited by R.A. Jarrell and A.E. Roos (Thornhill and Ontario, 1983): 197-217.

²¹ For a detailed explanation of the application of the SIC to the CANIND71 database, see Standard Industrial Classifications Applied to Historical Data, #7 in this series. A list of the more common SIC codes is appended to Creating CANIND71, #4 in this series.

Table 6
Ontario's largest industrial businesses by major industry group, 1871
comparing single measures with composite index

Major Industrial Group	capital only	employmt only	production only	added value only	composite index
2.00 Agricultural services	1		1	1	1
4.00 Mining/Quarrying		1			
5.01 Food, drink	13	2	38	15	3
5.02 Tobacco		2			
5.04 Leather (boots & shoes)	4	10	8	7	5
5.05 Textiles	11	7	7	7	6
5.06 Knitting		1			
5.07 Clothing	3	8	1	2	2
5.08 Wood processing	22	29	15	14	9
5.09 Furniture	5	3	4	4	4
5.10 Paper	3	1	1	1	1
5.11 Printing	5	7	4	5	5
5.12 Primary metals	2	2	2	2	2
5.13 Metal fabricating	5	6	4	6	4
5.14 Machinery	13	16	8	20	12
5.15 Transport equpmt	5	6	3	4	4
5.17 Non-metal:minerals		2		2	
5.18 Petroleum oil refineries	2		6	9	2
5.19 Chemicals			1		
6.00 Construction		1			
7.00 Gas and water utilities	8			1	
TOTALS	101	105	103	100	60

Note: * Some businesses are included in more than one column; see text.

The traditional view of Canadian industry in this period stresses its domination by the processing of farm and forest staples, though this is being modified by recent research and new syntheses.²² Manufacturing of consumer goods was assumed to have been of minor significance, particularly before the protective tariffs of the National Policy. As Gilmour remarks, it is difficult to be sure about the markets for manufactures in the mid to late nineteenth century. But following his classification, we may note the remarkably high proportion of leading businesses which were engaged in fabricating rather than simple processing and in the production of goods ready for use by

²² D. McCalla and P. George, "Measurement, Myth and Reality: Reflections on the Economic History of Nineteenth-Century Ontario," Journal of Canadian Studies 21 (1986): 71-86; Ian Drummond, Progress Without Planning: the Economic History of Ontario from Confederation to the Second World War (Toronto, 1987); Michael Bliss, Northern Enterprise: Five Centuries of Canadian Business (Toronto, 1987): 255-254.

consumers.²³ This large group includes the distilleries, boot and shoe and clothing factories, the furniture and printing establishments, and the makers of agricultural implements and tools, stoves and sewing machines, as well as much of the output of woolen and cotton cloth factories. Even the oil refineries produced mainly for domestic use. Simple processing of export staples is represented only by the raft-building and nine sawmilling businesses. The manufacture of producer goods is represented mainly by the rolling mills, large foundries and makers of engines, boilers and machinery, the railway workshops and part of the output of the textile, paper and saw mills.

Locations of Industrial Leaders

The sixty largest firms were distributed throughout the length of southern Ontario in 1871 from Sandwich East Township (Essex County) in the southwest to Ottawa, Almonte and Hawkesbury in the northeast. Figure 11 shows the location of the sixty largest businesses in relation to the balance of the 211 firms identified as ranking among the top hundred on at least one measure. While these second-rank businesses mainly cluster around the concentrations of larger enterprises, there is a noticeable scatter through the central Ontario region north of Toronto.

Only ten of the sixty leaders were located outside incorporated urban centres, and all but two of these were adjacent to or within a very short distance of a city or town. A fair degree of concentration in urban places is to be expected, reflecting the nodal location of towns and cities in the railway network (Figure 15) and their advantages in access to skilled and unskilled labour and the main consumer markets.²⁴ This can be appreciated by comparing Figures 14 and 15.

Two in three of the leading firms were located in the larger cities and towns. Toronto had sixteen, Hamilton eight (with another in adjoining Barton Township), Ottawa six, London one (with another just outside the city's eastern boundary), Kingston one, Brantford two, St Catharines one (with two more in neighbouring Merritton), and Guelph one. What is perhaps more remarkable is number of leading firms that were situated in communities of under 5,000 population. Oshawa (with two leading firms), Galt, Dundas, Ingersoll, Bowmanville and Almonte each had populations of between 2,500 and 5,000. Towns and villages like Mitchell, Trenton, Cornwall, Hawkesbury, Garden Island, Hespeler, Deseronto and Merritton were even smaller, several of

²³ J.M. Gilmour, Spatial Evolution of Manufacturing in Southern Ontario, 1851-1891 (Toronto, 1972); Appendix: J.H. Dales, "Estimates of Canadian Manufacturing Output by Markets, 1870-1915," Papers, Canadian Political Science Association Conference on Statistics, 1962 and 1963.

²⁴ The concentration of industrial activity in Ontario urban centres in 1871 is examined in Elizabeth and G.T. Bloomfield, The Ontario Urban System at the Onset of the Industrial Era, 1871, #3 in this series of research reports.

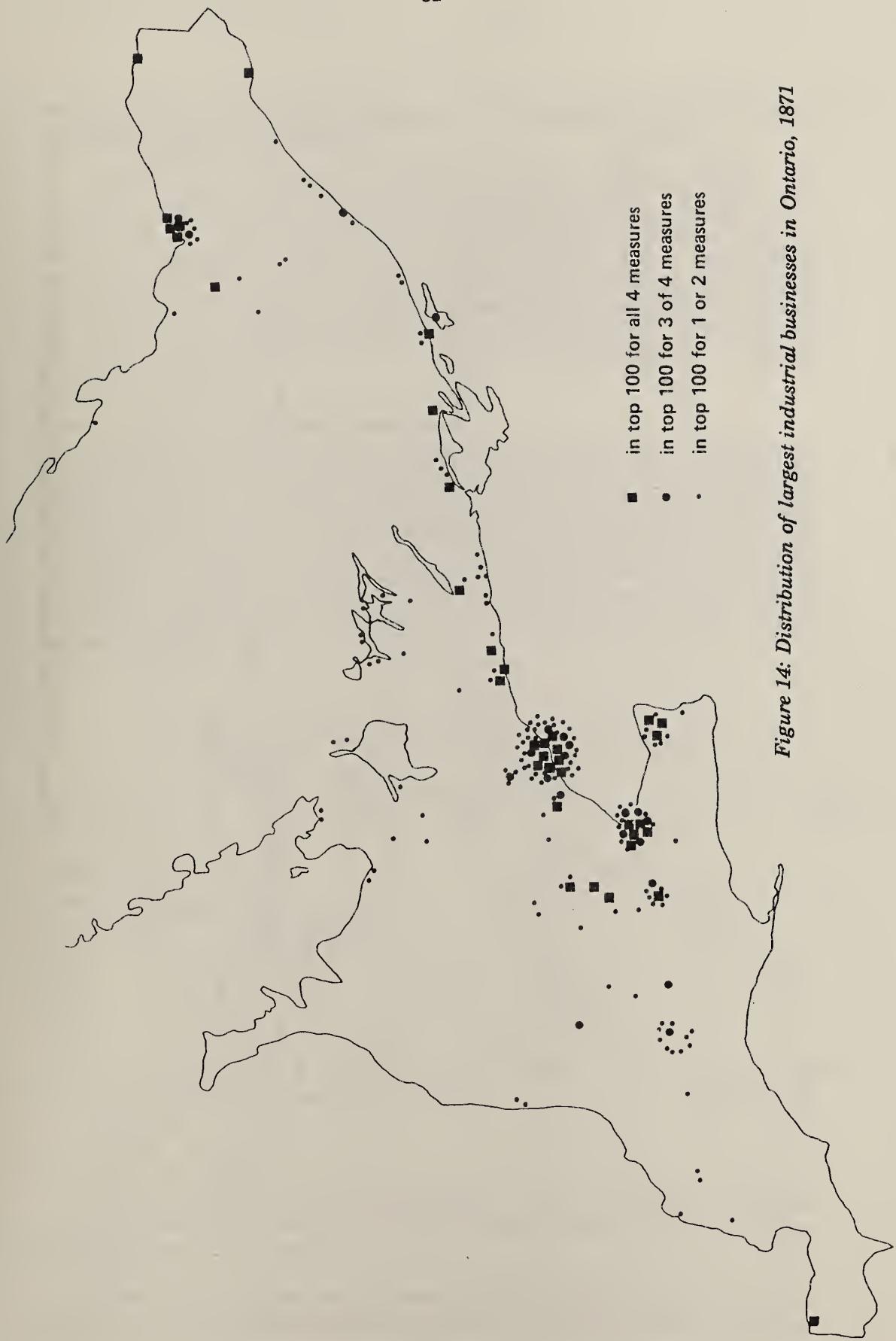


Figure 14: Distribution of largest industrial businesses in Ontario, 1871

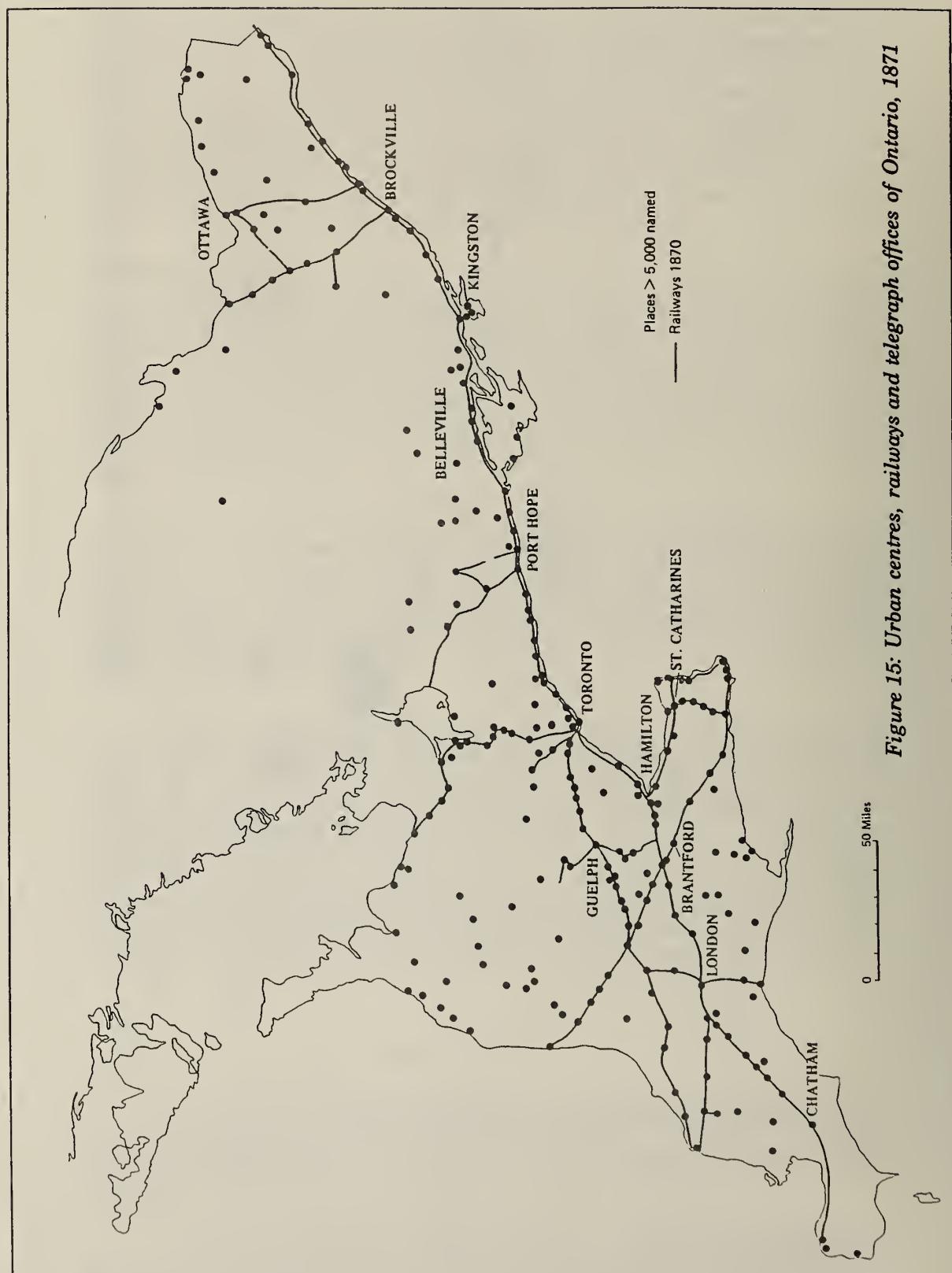


Figure 15: Urban centres, railways and telegraph offices of Ontario, 1871

them with only a few hundred inhabitants. In such places, a large firm clearly dominated the whole community.²⁵

Toronto shows definite metropolitan dominance within Ontario. In addition to sixteen of the sixty largest businesses, it had also 32 of the 151 second-rank businesses identified for this paper. This is a higher proportion than would be expected from Toronto's share of 12 per cent of total Ontario industrial production in 1871. But Toronto's role in Ontario was modest compared with Montreal's in Quebec. Montreal dominated the industrial structure of the province of Quebec to a much higher degree, with 44 of the 71 largest enterprises and 43 per cent of the total value of industrial production in Quebec.

Power Technology and Work Environments

Inanimate energy was used by the largest industrial firms much more commonly than by Ontario establishments generally. Only four of the largest businesses did not use water or steam power, while for all Ontario industrial establishments in 1871 the proportion of non-powered establishments was about three-quarters (Table 7). In Ontario industry generally, well over half the production of tobacco, boots and shoes, clothing, printing and publishing, miscellaneous manufactures, construction, and of trades and services such as blacksmiths was by manual power and not assisted by water wheels, steam engines or horses.²⁶

Table 7
Types of power in Ontario industry, 1871 (percentages)

Type of Power	Estabs	HP Force	Employment	Fixed Capital \$ value	Added Value \$
Waterwheels	11.9	58.2	16.3	26.0	18.2
Steam engines	9.8	36.4	32.0	48.9	41.5
Water/steam	0.6	4.0	1.8	2.7	1.8
Horses	3.3	1.4	2.8	1.5	2.0
Wind	(-)	(-)	(-)	(-)	(-)
Hand	74.4	-	47.1	20.9	36.4
Totals	100.0	100.0	100.0	100.0	100.0

Note: (-) under 0.1 per cent.

²⁵ For an analysis of the urban character of Ontario industry in 1871 see Bloomfield and Bloomfield, The Ontario Urban System at the Onset of the Industrial Era, #3 in this series.

²⁶ See G.T. Bloomfield and Elizabeth Bloomfield, Water Wheels and Steam Engines: Powered Establishments of Ontario, #2 in this series of research reports.

Table 8
Types of power used by Ontario's largest firms, 1871

Type of Power	# Firms	% Value added of 60 largest firms	% Employment of 60 largest firms
Water	14	13.3	21.6
Steam	40	80.8	67.4
Water/Steam	2	1.9	2.4
Hand	4	4.0	2.4
Totals	60	100.0	100.0

Steam engines were more significant as prime movers among the largest firms than generally in Ontario. Forty businesses (or two in three) reported use of steam power ranging from 10 horse power engines in furniture factories and printeries up to the very large capacities of the rolling mills in Hamilton (400 hp) and Toronto (250 hp). In their widespread distribution and diversity of industrial type, Ontario's larger steam-powered factories illustrate the greater flexibility of steam as motive power and the impending water-steam transition in which Ontario would shortly follow other industrializing regions.²⁷

Water power was reported by fourteen enterprises which were well defined in industrial type and location, and had much higher nominal capacities of up to and over 1000 hp. Five were the large saw mills in Ottawa, around the Chaudiere Falls and the Rideau Falls, where Bronson and Weston reported 2500 horse power, while the Hamilton Brothers mills at Hawkesbury on the Ottawa River reported 1500 horse power. All four woolen mills and the only flour mill were also powered by water wheels, at Almonte on the Mississippi River, at Cornwall on the St Lawrence, at Hespeler on the Grand, and at Streetsville and Meadowvale on the Credit. The other three water-powered businesses were located along the Welland Canal -- Riordan's paper mill and the Lybster cotton mill in Merritton and the Welland Vale works making agricultural hand tools in St Catharines. In addition, the Dundas cotton mill and the Patterson farm machinery works in Vaughan Township north of Toronto used water power which was boosted by steam engines at least seasonally. For more specific details on the use of power by the sixty largest firms, see Appendix A-5.

Hand power was used by only four of the sixty largest industrial firms--two businesses making boots and shoes, one clothing business and the raft-building operation at Garden Island. Thus, to use the classification of work environments evolved for Philadelphia by Laurie and Schmitz, only four of Ontario's industrial leaders were **manufactories**, the large majority being true

²⁷ G. and E. Bloomfield, "Water Wheels and Steam Engines: Industrial Power Reported in the 1871 Census," paper presented to KINGSTON V: Conference of the Canadian Science and Technology Historical Association (Ottawa, 1987).

factories using inanimate energy and with more than 25 workers.²⁸ There is scope for exploring patterns of work experience in these different types of work environments. The data could also support some analysis of whether in particular types of industry, investment in new powered technology gave better returns than relying on hand labour.

Status and Linkages of Industrial Firms

From the other material we have been able to gather about the sixty firms, we can generalize about their legal status, the place of origin of the entrepreneurs and some of the linkages between them and other business activities.

In 1871 few of the largest industrial firms were legally incorporated, supporting Risk's general analysis of the origins of the business corporation in Ontario.²⁹ By far the most common forms of business organization were the sole proprietor or the partnership, though the two Oshawa businesses were noted to be joint stock companies. The advantages and hazards of business partnerships have been well described by Katz in relation to the mid-century entrepreneurial class of Hamilton and by McCalla in the case of the Buchanans' business.³⁰

Business associates often had kinship ties by blood or marriage, so that brothers, father and sons, and brothers-in-law and sons-in-law would be business partners. At least one quarter of our leading firms seem to been partnerships linked by kinship ties, and at least some of the one fifth we have now identified as sole proprietors probably had kin-related associates. Among the many examples that might be quoted: the distillers Gooderham and Worts of Toronto were brothers-in-law, Hiram Walker took his sons into partnership in his Walkerville distillery, and George Randall and Herbert Farr who developed the woolen and worsted mill at Hespeler were cousins. The Beard

²⁸ B. Laurie and M. Schmitz, "Manufacture and Productivity: The Making of an Industrial Base, Philadelphia, 1850-1880," in T. Hershberg, ed. Philadelphia: Work, Space, Family and Group Experience in the Nineteenth Century (New York, 1981): 43-92. McKay has applied a similar typology to the Halifax baking industry at this time in I. McKay, "Capital and Labour in the Halifax Baking and Confectionery Industry During the Last Half of the Nineteenth Century," Labour/Le Travailleur 3 (1978): 63-70. For an application of the typology of work environments to Canada in 1871, see Bloomfield and Bloomfield, The Ontario Urban System at the Onset of the Industrial Era, #3 in this series of research reports.

²⁹ R.C.B. Risk, "The Nineteenth-Century Foundations of the Business Corporation in Ontario," University of Toronto Law Journal 23 (1973): 270-306.

³⁰ Michael B. Katz, The People of Hamilton, Canada West: Family and Class in a Mid-Nineteenth-Century City (Cambridge, MA, 1975): 176-208; Douglas B. McCalla, The Upper Canada Trade 1834-1872: A Study of the Buchanans' Business (Toronto, 1979). See also R.C.B. Risk, "The Law and the Economy in Mid-Nineteenth Century Ontario," in D.H. Flaherty, ed. Essays in the History of Canadian Law (Toronto, 1981).

brothers of Toronto, the Gurney brothers of Hamilton, the five Noxon brothers of Ingersoll and the Patterson brothers of Vaughan Township were all active in metal fabricating and the manufacture of farm machinery.

Sometimes partners had worked together for another employer and then "hived off" their own business in the same or similar product line. In Hamilton, for example, the Wilson Bowman Company was formed in 1868/9 by the former book-keeper (Andrew Wilson), machinist/inventor (Christopher Lockman), and agent (John Bowman) of the R.M. Wanzer sewing machine business which had been established in about 1860 in Hamilton (Figure 16).³¹

In other cases, merchants would join manufacturers in partnerships or as investors to make particular products in which they shared an interest. Thus Toronto and Hamilton dry-goods merchants were instrumental in starting the cotton mills at Merriton and Dundas and Montreal merchants invested in the woolen mills at Almonte and Cornwall. Dry-goods merchants at all scales of operation usually had some clothing manufacture associated with their establishments. More commonly, women would toil in workrooms above Main Street stores or on a outwork basis. Henderson & Bostwick's millinery and hat making enterprise was associated with their fancy goods retail store in Toronto (Figure 13). Some dry-goods merchants promoted the manufacture of clothing as a separate enterprise. The most notable example in Ontario as the result of a partnership between Hamilton merchant Donald MacInnes and William Sanford in the Sanford MacInnes Company which produced cheap, ready-made clothing from 1862 and was the largest employer of women in Ontario in 1871.³²

The distinction between merchant and manufacturer was blurred in other lines of business. Several of the sawmilling businesses were described as lumber merchants in other contemporary sources and most of the large footwear manufacturers were described as wholesale footwear importers and merchants as well. John McPherson & Co of Hamilton told the enumerator that the firm "also purchased boots, shoes and india rubbers at \$50,000 annually in addition to our own manufacture" for distribution to retail stores.

Only six of the leading firms of 1871 were incorporated. These were the three railway companies which repaired their own cars and locomotives, the Canadian Engine Company of Kingston (incorporated 1862), and two woolen textile operations - the Cornwall Manufacturing Company (incorporated 1867) and the Rosamond Woolen Company of Almonte (incorporated 1870). It is perhaps significant that Montreal investors, most notably George Stephen, were important in both these textile companies.³³ Another eleven of our industrial

³¹ Martha E. Brent, "A Stitch in Time: The Sewing Machine Industry of Ontario, 1860-1897," Material History Bulletin 10 (1980): 23.

³² Melville Bailey, ed. Dictionary of Hamilton Biography (Hamilton, 1981): 133, 178-9.

³³ For the Rosamond business, see Richard Reid, "The Rosamond Woolen Company of Almonte: Industrial Development in a Rural Setting," Ontario History 75 (1983): 266-289. For the Cornwall Manufacturing Company, see

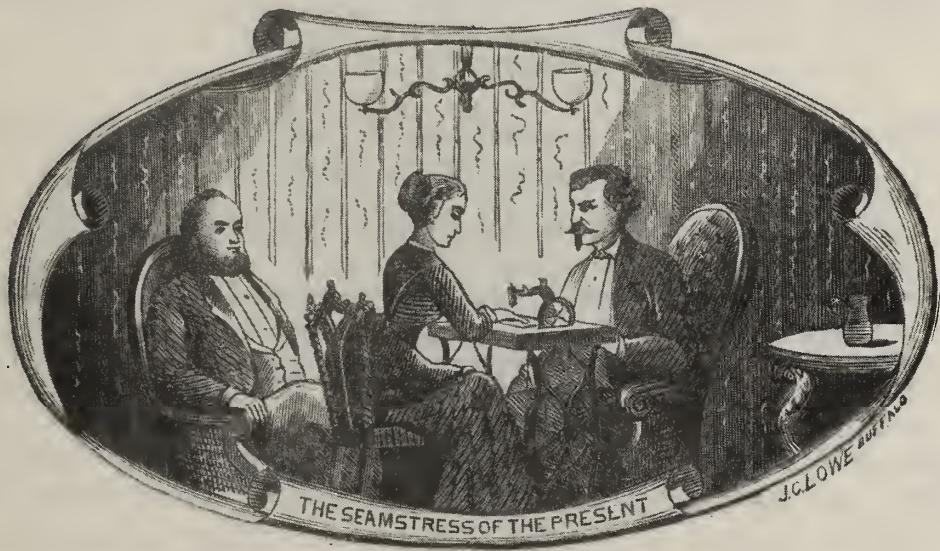
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leaders would incorporate in the twenty years following the 1871 census, including Noxon of Ingersoll (1872), Welland Vale of St Catharines (1873), Waterous of Brantford (1874), Smart of Brockville (1881), Gooderham and Worts of Toronto (1882), Rathbun of Deseronto (1883), Calvin of Garden Island (1886), Sanford of Hamilton (1887), Hiram Walker of Walkerville (1890), Riordan of Merriton (1890), and Goldie McCulloch of Galt (1891).

Can we generalize about the "social origins" of the industrial elite in our sample?³⁴ We have so far been able to trace adequate biographical data for only 38 of our 60 firms, but of these 17 came from the United States where they had business experience, ten were from Scotland, six from Northern Ireland and three from England. Two were from Montreal and several others seem to have been local entrepreneurs born and raised in Upper Canada.

Various other linkages may be traced for our group of large industrial firms. There is only one example of the American branch plant, the Joseph Hall Iron Works established in Oshawa in 1857 as a branch of the Joseph Hall Company of Rochester, NY, and headed by F.G. Glen, Hall's son-in-law (Figure 17).³⁵ But there is also an example of an Ontario branch of a Montreal-based enterprise in the Toronto boot and shoe factory of Childs and Hamilton, which was established in 1855 by Brown and Childs of Montreal.³⁶ Several of our Ontario firms had branch plants of their own. Three Hamilton businesses had developed such branches to gain access to labour and/or markets: John McPherson had another boot and shoe factory in London, the Gurney firm had another foundry and stove works in Toronto, and the Wilson Bowman sewing machine company established a branch in Fergus during 1870.

Elinor Kyte Senior, From Royal Township to Industrial City: Cornwall 1784-1984 (Cornwall, 1983). For both companies in the context of the larger history of Canadian textile mills, see Felicity L. Leung, "Catalogue of Significant Extant Textile Mills Built in Canada Before 1940" (prepared for the Historic Sites and Monuments Board, 1986).

³⁴ Data for the 1870 industrial leaders might be compared with Acheson's business elite in the 1880-1885 period, T.W. Acheson, "The Social Origins of the Canadian Industrial Elite, 1880-1885," in David S. Macmillan, ed. Canadian Business History: Selected Studies, 1497-1971 (Toronto, 1972). We note that only 12 of the 70 industrial leaders identified by Acheson were on our 1870 list; part of the difference may be explained by Acheson's qualitative criteria and dependence on biographical dictionaries.

³⁵ M.M. Hood, Oshawa, A History of Canada's Motor City (Oshawa, 1968): 70-72; Leo Johnson, History of the County of Ontario, 1615-1875 (Whitby, 1973): 250-252. For a brief account of the Hall firm in its Oshawa context, see Elizabeth Bloomfield, "Using the 1871 census manuscript schedules: a machine-readable source for social historians", Histoire sociale 19 (1986): 436-440.

³⁶ G.C. Kealey, Toronto Workers Respond to Industrial Capitalism, 1867-1892 (Toronto, 1980): 21-23; J. Burgess, "L'industrie de la chaussure," Revue d'histoire de l'Amerique française 31 (1977): 187-210.

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Figure 19: Source: J.M. & Edu. Trout, *The Railways of Canada* (1871), pp. 178-9.

Other firms reached back to raw materials or diversified their industrial activities for various reasons. The Robert Hay Company had a large saw and planing mill at New Lowell in Simcoe County supplying parts for its Toronto furniture factory, while Gooderham and Worts had two other flour mills at Streetsville and in Vaughan Township as well as the large mill at Meadowvale (Figure 8) and the one associated with their Toronto distillery. Various sawmilling enterprises also operated grist and flour mills to make greater use of their water power, as the Bronson and Young sawmilling firms combined to do with their large flour mill at Ottawa and McDougall and Ludgate did in Hamilton Township. Noxon Brothers of Ingersoll had a lumber mill there and others in the Walkerton area to supply their needs for wood products in making agricultural machinery.

Large enterprises in isolated places often developed smaller-scale industrial activities to provide goods needed by their major concern or to supply their workers with necessities or off-season work. At Garden Island, Calvin and Breck operated a shipyard in conjunction with their main rafting and forwarding business, to provide winter work for 35 of their men.³⁷ At Hawkesbury, the Hamilton Brothers also ran a grist mill, a bakery, a harness shop, a wagon shop and a blacksmith shop in addition to their huge saw mills.³⁸ At Deseronto, H.B. Rathbun & Son had a shipyard, a harness shop and a blacksmith forge as well as their large steam saw mill; their saw mill in Belleville was the largest business in that city and they ran saw mills also in rural Richmond and Camden East Townships in inland Lennox and Addington County.³⁹

4 MEASURING INDUSTRIAL DOMINANCE

Economic and business historians have long been fascinated with the forces of competition and the trend to monopoly power from the later nineteenth century. The CANIND71 database allows us to examine the organization of industrial capitalism a little earlier, at a time of transition from artisanal craftshops to factories using machinery and integrated work processes. It is also useful to see the larger firms in the context of the whole industry and in relation to the persistence in some sectors of a great deal of small-scale artisanal activity. Earlier interpretations of the industrialization process, based on the "textile paradigm", in which the craftsman was abruptly displaced by the modern factory, have been modulated into an awareness of the variable paths of development followed by different industrial sectors. How well do the Ontario data support the concept of "concurrent phases of capitalist growth" in which factories, manufactories and

³⁷ See also Christian Norman, "A Company Community: Garden Island, Upper Canada at Mid-Century," Canadian Papers in Rural History 2 (1980): 113-134.

³⁸ See also M. Higginson, The Village of Hawkesbury, 1808-1888, in the Era of the Hamilton Brothers (Hawkesbury, 1961).

³⁹ See also D.M. Wilson, Lost Horizons: The Story of the Rathbun Company and the Bay of Quinte Railway (Belleville, 1983).

artisans co-existed? And can we say whether the new large factories were more or less productive than the manufactories or craftshops?

As a preliminary contribution to more work on industrial concentration in Ontario, we present a summary of the degree of dominance in each of the sectors represented by the largest firms identified for this paper. Three measures of concentration are used, all using the variable of value added in manufacturing. Table 9 and Figure 19 use the percentage of total added value in a sector contributed by representatives of that sector among our large industrial firms and the percentage of total added value produced by the single-firm leader in that sector. The table and graph are arranged in order from the most concentrated sectors to the least.

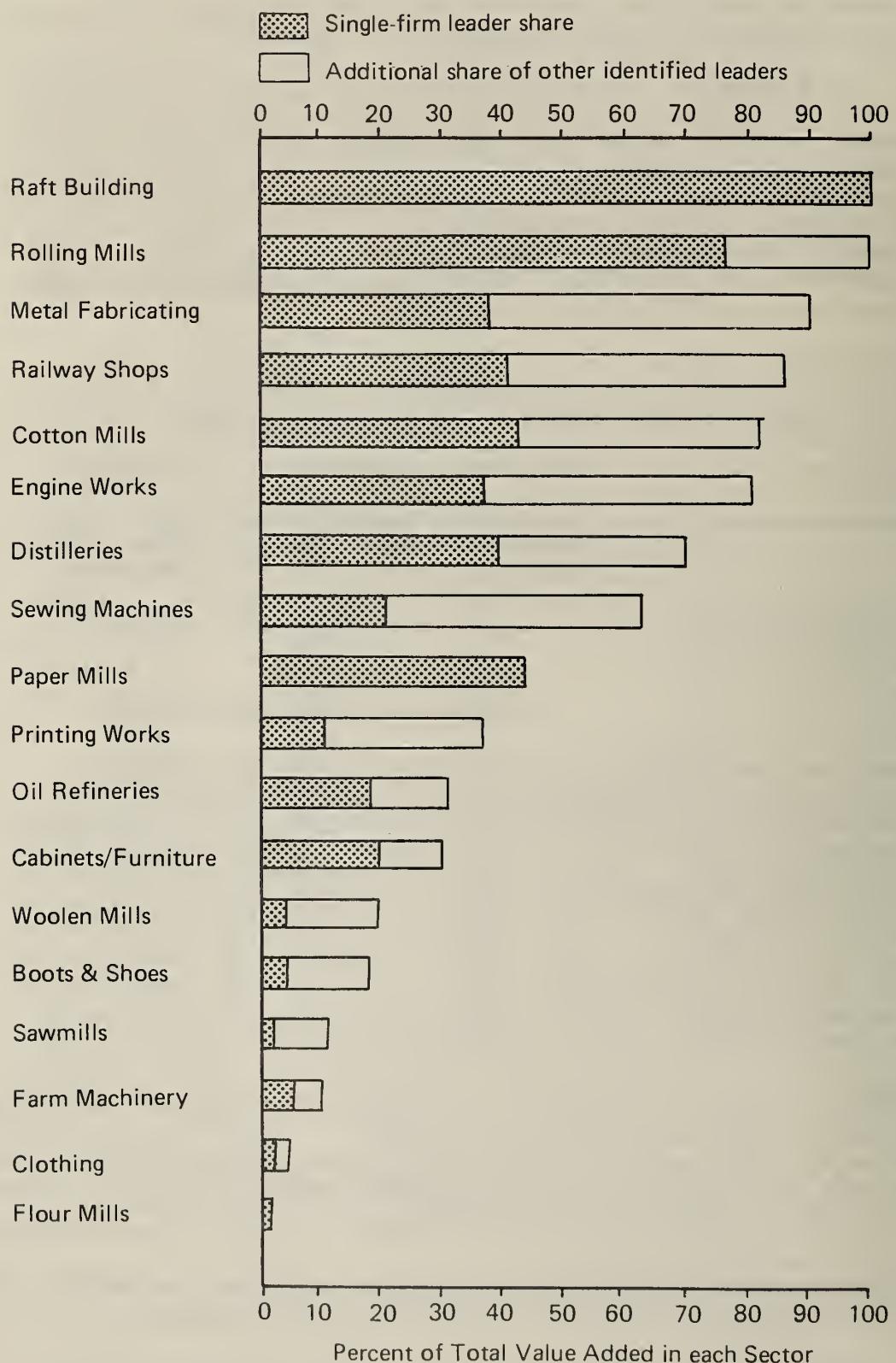
Table 9
Concentration in selected Ontario industry groups, 1871: 1

Column #1	Column #2	Column #3	Column #4
Sector (SIC code)	Total # of Enterprises in Ontario	Leaders % Total Added Value	Single-firm Leader % Total Added Value
Raft-building (031)	1	100.0	100.0
Rolling mills (291-R)	2	100.0	73.9
Railway shops (326)	12	86.2	40.6
Cotton mills (181)	6	81.9	42.4
Engine works (315-E)	22	79.8	35.8
Distilleries (109-D)	20	69.2	37.2
Sewing machines (315-S)	12	62.5	21.4
Metal fabricating (305/6/7)	143	89.6	37.3
Paper mills (271)	11	44.5	44.5
Printing/publishing (289)	218	37.7	10.4
Oil refineries (365)	46	29.8	18.1
Furniture/cabinet makers (261)	566	28.3	19.3
Boots and shoes (174)	1989	17.4	4.8
Woolen mills (182)	210	18.0	5.1
Saw mills (251)	1956	11.6	2.2
Farm implement makers (311)	364	11.5	4.7
Clothing/millinery (242/9)	1525	5.1	3.3
Flour mills (105)	923	1.9	1.9

Notes:

- Column #1: Only those industrial sectors represented among the sixty largest industrial firms are included in this table.
- Column #2: Total numbers of establishments derived from tabulations of CANIND71 database by dominant SIC code (subsuming any composite codes in the primary code).
- Column #3: Total added value of leading firms in sector as percentage of total added value in that sector.
- Column #4: Added value of single leading firm in sector as percentage of total added value in that sector.

Figure 20: CONCENTRATION IN SOME ONTARIO INDUSTRIES 1871



Rolling mills, metal fabricating, railway workshops, engine works, cotton mills and distilleries are obviously the sectors in which the value added by industrial activity is most concentrated in one or a few leading firms. In these sectors, the defined largest firms account for at least 60 per cent of all the added value in that sector across Ontario and the largest single firm contributed over 35 per cent in most cases. In contrast, in the ubiquitous industry types such as flour mills, clothing, farm machinery and saw mills, the largest firms account for quite small percentages of the total value added in each of those sectors. The nine large saw mills identified among our largest firms, for example, account for under 12 per cent of the value added by all the 1,956 saw mills in Ontario and the largest single mill, Hamilton Bros of Hawkesbury, contributed only 2 per cent of the total. The sectors of paper mills, printing/publishing, oil refineries, furniture makers, boots and shoe and woolen mills occupy intermediate ranks on this scale. The group of largest firms in each of the sectors accounts for between 17 and 45 per cent of the total added value in that sector. The share of the single leading firm in each of these sectors is as high as the Riordan paper mill's 45 per cent, but more typically ranges between 5 and 20 per cent.

Table 10
Concentration in selected Ontario industrial sectors, 1871: 2

Sector (SIC code)	# Enterprises in Ontario	# Leading Firms	Leaders-Sector Ratio
Raft-building (031)	1	1	1
Rolling mills (291-R)	2	2	1
Cotton mills (181)	6	2	2.5
Sewing machines (315-S)	12	3	2.5
Railway shops (326)	12	4	2.6
Paper mills (271)	11	1	4.9
Engine works (315-E)	22	6	5.5
Oil refineries (365)	46	2	6.8
Distilleries (109-D)	20	2	6.9
Printing/publishing (289)	218	5	10.7
Woolen mills (182)	210	4	12.7
Metal fabricating (305/6/7)	143	4	13.3
Farm implement makers (311)	364	3	14.0
Flour mills (105)	923	1	17.7
Saw mills (251)	1956	9	25.1
Clothing/millinery (242/9)	1525	2	38.7
Furniture/cabinet makers (261)	566	4	40.1
Boots and shoes (174)	1989	5	69.4

Notes:

1. Only those industrial sectors represented among the sixty industrial leaders are included in this table.
2. Total numbers of establishments derived from tabulations of CANIND71 database by dominant SIC code (subsuming any composite codes in the primary code).
3. Leaders-sector ratio means the number of times the average added value of largest firms in a sector exceeds the average added value of all firms in that sector.

Table 10 ranks the industry types represented among our group of the largest firms according to the leaders-sector ratio. This measure is derived from a calculation of the number of times the average added value of the leading firms in a particular sector exceeds the average added value of all firms in that sector. Thus the mean added value of the two cotton mills at Merriton and Dundas was 2.5 times the mean added value of all six cotton mills in Ontario. The five leading printers and publishers had a mean added value 10.7 times that of all 218 printers and publishers across Ontario. At the other end of the scale, the two clothing manufactories had a mean added value 39 times that of all 1,525 firms in that sector and the five boot and shoe manufacturers had a mean added value 69 times that of all the 1,989 establishments making footwear.

Understandably there is an inverse relationship between high measures of dominance and the total number of firms in a sector. If there are only a few firms in a particular sector, the share of total output of the largest will tend to be higher. Thus it is all the more remarkable to find quite high single-firm and leaders' shares in such sectors as printing/publishing, furniture and cabinets, boots and shoes, which had hundreds or thousands of firms.

It may be observed that our group of largest firms exhibit three different sectoral structures and patterns of development. In one group, including rolling mills, railway workshops, sewing machine factories, cotton and paper mills, distilleries, oil refineries and engine works, the leading firm was simply first among a small group of broadly similar-sized firms. Its output or value added was no more than about seven times the average output or value added of all the firms in that sector.

The second group is represented by woolen mills, metal fabricating works, farm machinery makers, printers and publishers, flour mills and saw mills. The group of largest firms had output or value added in the range of between 10 and 25 times greater than the average firm in that sector. Each of these sectors had at least one hundred establishments widely scattered spatially for access to raw materials and/or market areas, but using much the same technology at different scales of operation.

In a third group, including boots and shoes, clothing and millinery, and cabinets and furniture, all with leaders/sector ratios of between 39 and 69, there was a marked contrast between the technology and scale of operation of a handful of manufactories or factories and the great mass of artisanal establishments.

Various factors are likely to be significant in trying to explain these sectoral groupings. One is the amount of capital required to begin operating in particular lines of industry and thus the ease of entry to new enterprises.⁴⁰ New enterprises in some sectors apparently needed more substantial capital to begin business. In other sectors it was possible for new enterprises to begin on a small scale and gradually to develop greater capacity and output. The

⁴⁰ Joe S. Bain, Barriers to New Competition: Their Character and Consequences in Manufacturing Industries (Harvard, 1962).

recording of data for fixed capital (distinguished from floating or working capital) in the 1871 Canadian census permits us to calculate mean values of capital investment by sectors.

In Table 11, we present the results of calculations of mean values of fixed capital invested in the factories and manufactories of Ontario, here defined as the 440 firms that employed 26 or more workers. These firms accounted for about 45 per cent of the total fixed capital invested in industry in 1871. Only sectors that are represented in our list of 60 largest firms are included here, and they are ranked in order of mean value of fixed capital invested in the factories and manufactories. The data suggest some correlation between high degree of concentration and high values of fixed capital investment, which is supported by more detailed investigation of particular industries. At one extreme, very substantial capital investment was required to produce railway locomotives and rolling stock, whisky, cotton or paper. In contrast, entrepreneurs could set up in business making clothing, footwear or furniture with quite modest capital. From small beginnings they could hope to expand gradually. In an intermediate group were factories making woollen textiles, farm implements or sewing machines.

Table 11
Ontario firms employing at least 26 in 1871:
Mean value of fixed capital investment

Sector (SIC)	N	Mean Fixed Capital (\$)
Railway workshops (326)	9	816,333
Distilleries (109-D)	3	142,400
Cotton textile mills (181)	4	112,500
Paper mills (271)	3	95,333
Rolling mills (291-R)	2	85,000
Engine making (315-E)	13	54,538
Furniture (261)	14	53,214
Saw mills (251)	85	44,580
Oil refineries (365)	3	41,666
Boots and shoes - powered (174)	3	40,000
Woolen textile mills (182)	30	38,795
Flour mills (105)	4	37,500
Printing/publishing (289)	18	33,861
Metal fabricating (305-307-S)	22	30,454
Sewing machines (315-S)	7	27,428
Farm implements (311)	25	25,200
Boots and shoes - hand (174)	14	14,971
Clothing - hand (242/249)	53	8,021

The manufacture of **sewing machines** had quite a simple industrial structure (Figure 21). In 1871, there were only twelve firms making sewing machines in Ontario, three of them clearly ranking among our industrial leaders, each with at least 130 employees and production valued at over \$200,000. Four others had production values in the range of \$50,000 to

1871 CENSUS:
SEWING MACHINE MANUFACTURE (S.I.C. 315-S)

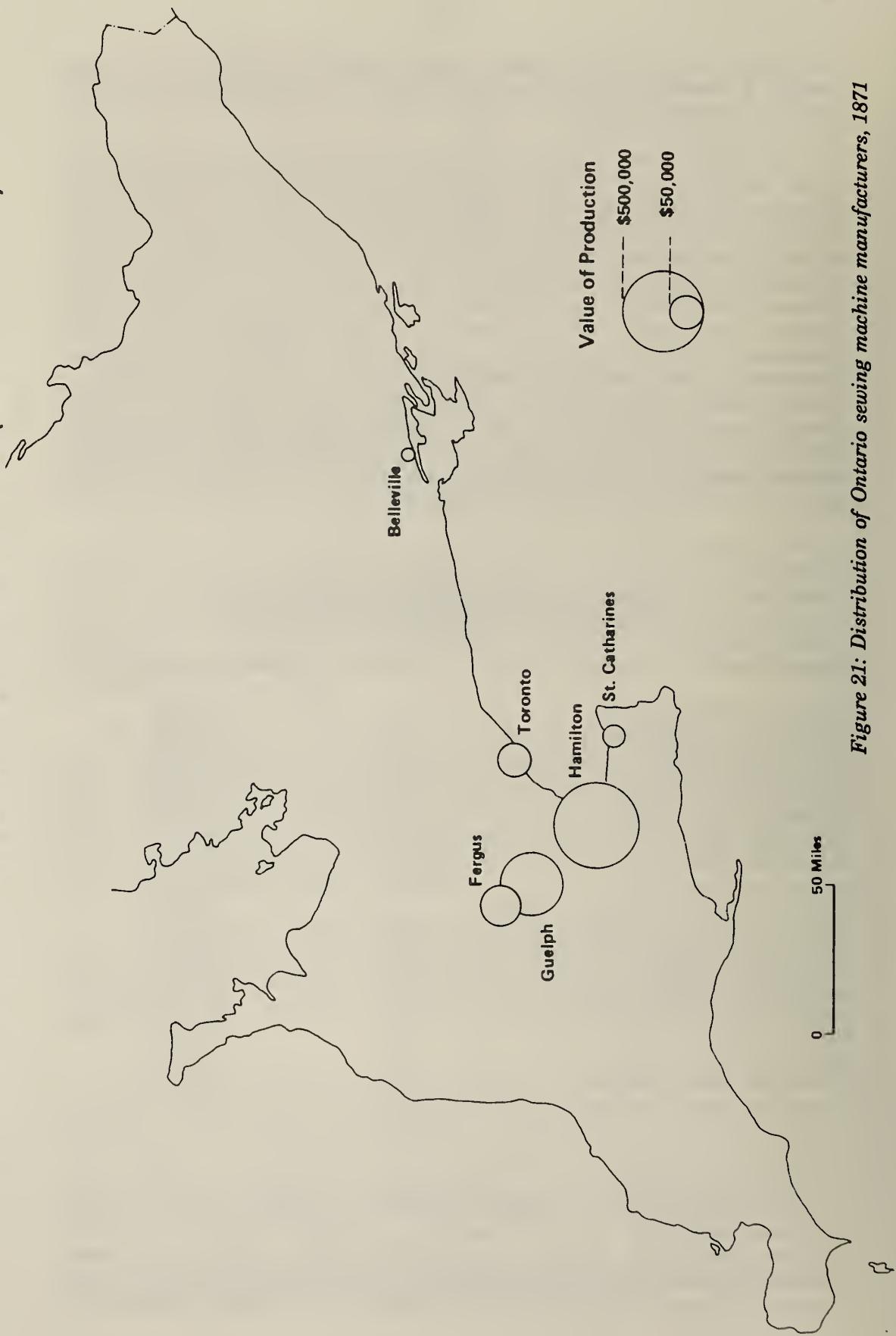


Figure 21: Distribution of Ontario sewing machine manufacturers, 1871

\$100,000, and from 25 to 70 workers. Two of these second-rank businesses, the Gardner Company of Hamilton and Charles Raymond of Guelph, were to become more significant firms after 1870. There were also four smaller firms. All used steam power and much the same technology, and depended on other firms in the foundry business for their castings and other parts. While factories were located as far apart as Belleville and St Catharines, the industry was notably concentrated in the Hamilton and Guelph areas. There is also one example of a branch factory, established during 1870 in Fergus by the Wilson Bowman Company of Hamilton (see also Figures 10 and 16).⁴¹

Cabinet and furniture-making had a much more complex structure in 1871, ranging from the smallest one-man craftshops to a few of the largest factories of any sector. The four which rank among our industrial leaders were clearly in a class of their own among other makers of furniture, each employing over 50 workers and producing at least \$135,000 worth. Robert Hay and Company of Toronto, William H. Gibbs of Oshawa, George Moorhead of London and F.F. McArthur of Bowmanville together made just two-fifths of the total value of all furniture manufactured in Ontario in 1871. The nine businesses employing between 26 and 50 workers and the 56 with 6 to 25 workers each contributed nearly a further third.

Table 12
STRUCTURE OF ONTARIO CABINET AND FURNITURE MAKING SECTOR, 1871

Size Class	Estabs #	Employees #	Added Value \$	Mean Vadd/ Estab \$	Mean Vadd/ Worker \$
Urban					
51 + workers	4	854	410,000	102,500	480
26 - 50 workers	9	312	126,605	14,067	406
6 - 25 workers	56	654	385,032	6,876	589
1 - 5 workers	164	409	215,577	1,314	528
Rural	333	636	310,821	933	489
Total Ontario	566	2,865	1,448,033	2,558	506

The firm of Robert Hay & Company was not only by far the largest furniture business in Ontario but also ranked second overall on the composite index in relation to all other Ontario industrial firms. Until 1871, this business had been Jacques & Hay (familiarly known as "Jakesenhay"), started in Toronto in 1835 and was the largest factory of any kind in that city by 1856. It continued to expand in the 1860s, practically doubling its value of fixed capital, numbers of male workers and value of production between the 1861 and 1871 censuses. As with the other three large furniture factories, it was

⁴¹ More context is provided by Martha E. Brent, "A Stitch in Time: The Sewing Machine Industry of Ontario, 1860-1897," Material History Bulletin 10 (1980): 1-30.

1871 CENSUS: FURNITURE (S.I.C. 261)

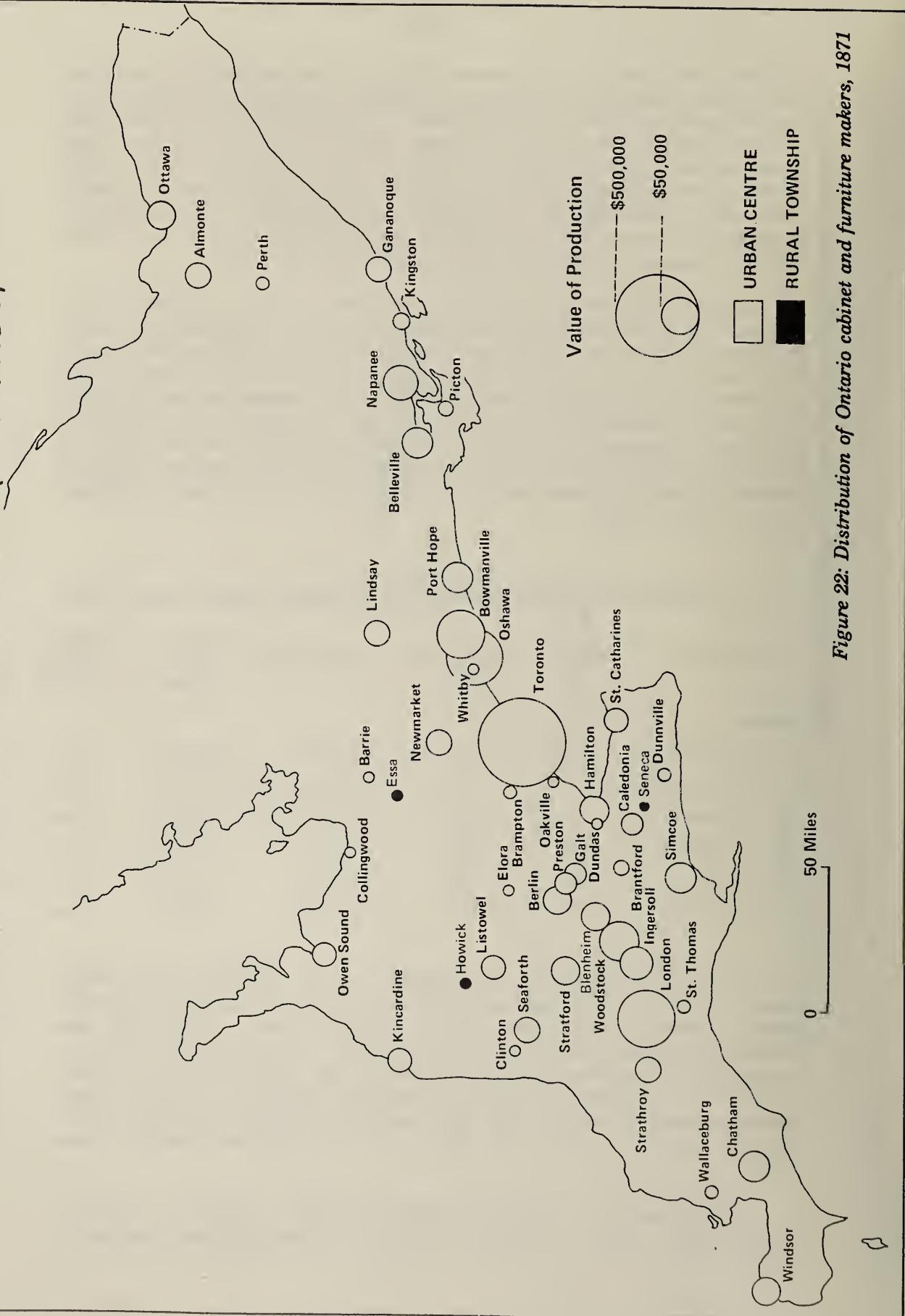


Figure 22: Distribution of Ontario cabinet and furniture makers, 1871

notable for the employment of women. In 1870, John Jacques retired, and Robert Hay took Charles Rogers (chief carver) and George Craig (head turner) into a partnership which lasted till 1885, when Hay himself retired. The business was then reorganized as Charles Rogers & Sons Co, which continued to operate until 1922. The Jacques & Hay business also illustrates the phenomenon of backward integration, in the subsidiary operations developed from 1854 at New Lowell, in Sunnidale Township, along the line of the Northern Railway near Barrie. Valuable hardwood forests there were transformed into parts for the Toronto factory, under the management of Peter Paton, who was Hay's brother-in-law.⁴²

But the furniture sector also shows a notable persistence of small establishments, with 164 businesses in urban centres employing one to five workers each and producing 12.5 per cent of the provincial output. Of the 333 furniture businesses in rural Ontario that produced the balance of 16 per cent of output, only eleven employed more than five workers and only three had an output of over \$10,000. Figure 22 shows the distribution of the 78 furniture factories that had outputs of at least \$5,000 in 1871, virtually all of them urban. The only rural establishment in this sector that employed more than 26 workers was the Hay and Paton factory at New Lowell, described above. Many smaller cabinet-makers found it necessary to combine the making of wooden furniture with other activities, one of the most common being coffin-making and general undertaking services; another was the repair of furniture.⁴³

Predictably, the mean value added per establishment making cabinets and furniture declined systematically through the five size classes in Table 12. But were the larger businesses more efficient and productive in terms of the value added per worker? The furniture data show that the value added per worker was not highest in the larger businesses. Indeed, it was considerably higher among the establishments employing fewer than 25 workers than among those with larger workforces. Even the small establishments in rural Ontario had higher mean values than the largest businesses. Nor did the use of inanimate power lead to greater productivity. Virtually all the establishments producing over \$10,000 used steam-engines or water wheels; for the small businesses with

⁴² In addition to the references in the previous note, the following are useful sources on the Robert Hay furniture enterprise: R. Cathcart, Jacques & Hay: 19th Century Toronto Furniture Makers (Erin, 1986); G.C. Kealey Toronto Workers Respond to Industrial Capitalism, 1867-1891 (Toronto, 1977): 11..29. According to the 1871 census, Hay and Paton's saw mill and furniture enterprise employed 32 men and used a 50 horse-power steam engine to perform some of the primary processes in furniture-making. See also Ian Radforth, "Business Organization and the Problem of Distance in Mid-19th Century Ontario" in Canadian Papers in Business History edited by Peter Baskerville (forthcoming, 1990).

⁴³ L.G. Pennachio and L.B. Pogue, "Inventory of Ontario Cabinet-Makers, 1840-ca.1900: Work in Progress," Material History Bulletin 18 (1983): 39-44; J. McIntyre, "From Workshop to Factory: The Furniture Maker," Material History Bulletin 19 (1984): 25-35; E. and G. Bloomfield, "Mills, Factories and Craftshops of Ontario, 1870," Material History Bulletin 25 (1987): 35-47.

under \$5,000 output, the proportion with non-manual energy declines to between one-quarter and one-third. Yet the 117 businesses reporting steam or water power had a mean value added of \$498 per worker while the balance of 447 establishments using hand power only had a higher mean value added of \$518 per worker.

Data for other industry groups in 1871 offer potential for measuring the degree to which increasing concentration of a particular industry in a few large plants was associated with greater productivity and profitability. Were the new large powered factory units more efficient and productive than the artisanal shops or manufactories? Laurie and Schmitz have found evidence in nineteenth-century Philadelphia to support Chandler's contention that increasing size and mechanization of factories did not necessarily lead to economies of scale and that scale might indeed be a liability.⁴⁴ Sokoloff and Aattack have interpreted general U.S. census data for the same period differently to show that mechanization and increasing the scale of operation did lead to productivity gains.⁴⁵ Our data for the furniture industry show that the larger factories were not more productive per worker, but this may not have been the case in every sector in Ontario. The persistence of small artisanal establishments in many sectors, into the early twentieth century, might also be considered in this context.⁴⁶

5 MEASURING BUSINESS SURVIVAL AND LONGEVITY

In our research into the largest industrial businesses in Ontario, we can also take a longitudinal perspective. We have examined the pre-1871 origins and evolution, as well as the subsequent development and fate of the sixty selected firms. We can only sketch some of the patterns and tendencies here. But there is scope for more research on the following questions. How long had the firms been in operation? Which of them had been started on a substantial scale as instant factories, and which had evolved more gradually from small beginnings? To what extent did the selected firms change their locations and product specialties over time? Did relatively large size by 1871 mean that a firm had an assured future? Why did some firms fail and others endure? What does an analysis of the sixty largest firms tell us of entrepreneurship, the significance of location and the product cycle, and the volatility of business success?

⁴⁴ Laurie and Schmitz, in "Manufacturing and Productivity" (pp.66-88) measured the efficiency of industrial production by calculating total factor productivity, using a Cobb-Douglas production function, in which the variables were value added, labour, capital and power.

⁴⁵ Kenneth Sokoloff, "Was the Transition from the Artisanal Shop to the Nonmechanized Factory Associated with Gains in Efficiency? Evidence from the U.S. Manufacturing Censuses of 1820 and 1850," Explorations in Economic History 20 (1984): 351-382; Aattack, "Firm Size and Industrial Structure."

⁴⁶ Kris Inwood and John Chamard, "Regional Industrial Growth During the 1890s: The Case of the Missing Artisans," Acadiensis 16 (1986): 101-116.

By searching a variety of sources, we were able to assemble information on the starting dates of all but four of the selected firms and on the closure dates of all but three of them. We have also collected other material on the history and operations of the sixty industrial leaders, including such factors as the ethnic origin of the entrepreneurs, the legal status of the firm in 1871, and the connections with other businesses of the time. For a summary of some of this information, see Appendix A-6.

Table 13
Beginning dates of Ontario's leading industrial firms
 (numbers of firms beginning in each decade)

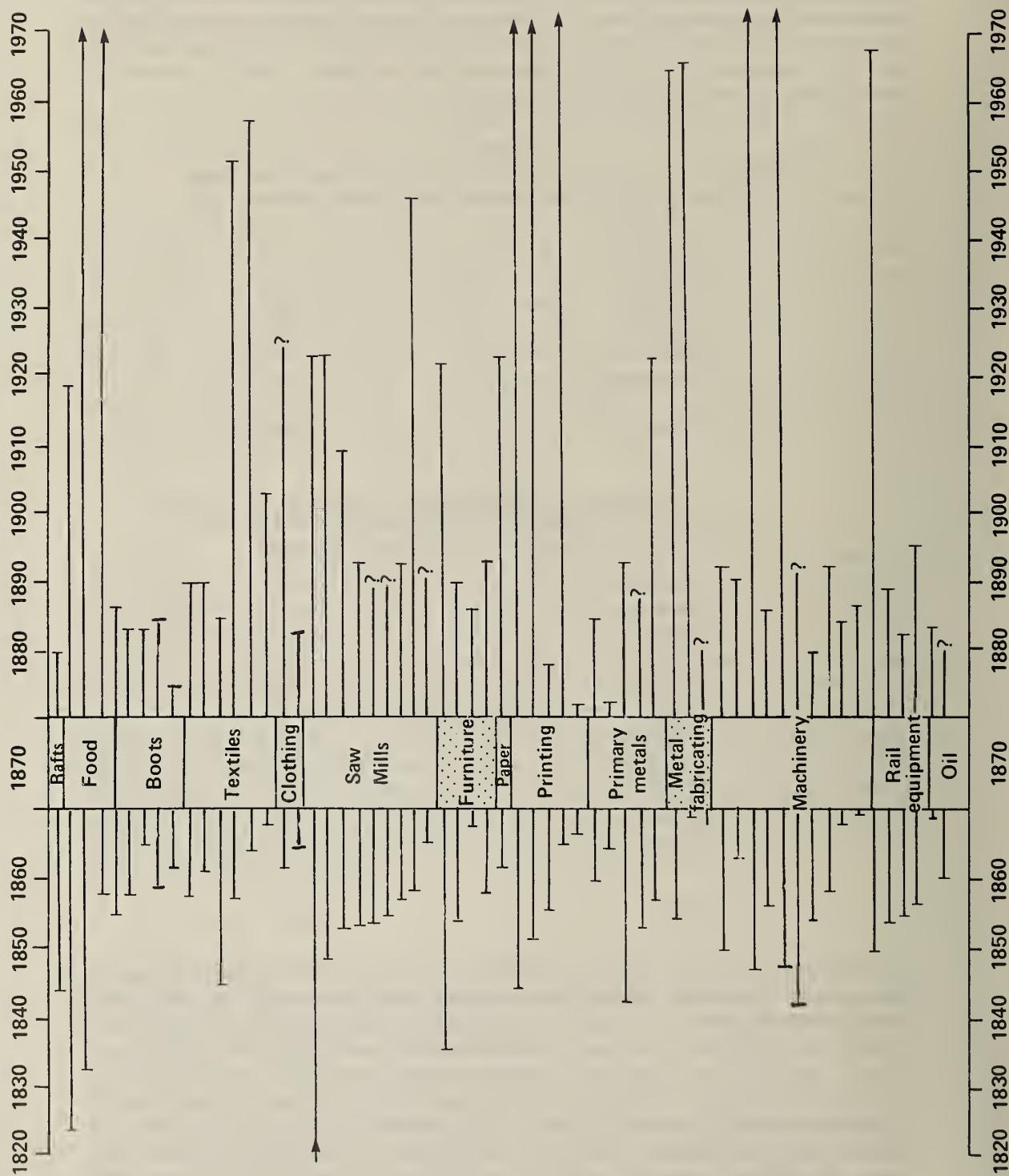
Pre-1830	1
1830s	3
1840s	8
1850s	26
1860s	17
1870	1
not known	4
Total	60

Table 14
Cessation dates of Ontario's leading industrial firms
 (numbers of firms ending in each decade)

not known	3
1870s	3
1880s	17
1890s	14
1900s	2
1910s	3
1920s	5
1930s	-
1940s	1
1950s	2
1960s	3
1970s	-
Post-1980	7
Total	60

As Table 13 and Figure 23 show, only twelve of the sixty industrial leaders began operation before 1850. Pioneer firms starting before 1840 were the Hamilton Brothers saw mills at Hawkesbury (1808), Gooderham and Worts' Toronto distillery (1832), Jacques and Hay's cabinet-making business (1835) and Calvin's raft-building operation at Garden Island (1836). Businesses starting in the 1840s were the Soho Foundry in Toronto (1840), the Gurney iron foundry in Hamilton (1842), George Brown's Globe printery in Toronto (1844), the Barber brothers' woolen mill on the edge of Streetsville (1844), the Meadowvale flour mill (1844) which by 1870 was owned by Gooderham and Worts, the Waterous foundry and engine works in Brantford (1848), the Goldie and McCulloch firm in the same line in Galt (1848) and the Rathbun saw mills at Deseronto (1848).

Figure 23: Longevity of largest industrial businesses by sector



The 1850s saw a boom in business starts, with over 40 per cent of the selected businesses commencing at locations all over southern Ontario. A significant number of new businesses beginning in this decade were six saw mills (five at the Chaudiere Falls in Ottawa and one at Trenton).⁴⁷ Other lines established in the 1850s were the four railway equipment and repair shops, seven foundry/metal fabricating/machinery works, two newspaper publishers, three boot and shoe manufactories, as well as Rosamond's woolen factory at Almonte, the furniture factory in Bowmanville, the Dundas cotton mill and Hiram Walker's distillery in Essex County. The 1860s accounted for another 30 per cent of business starts, in a variety of industrial groups but including rolling mills⁴⁸, oil refineries and ready-made clothing for the first time. It is quite likely that the four businesses whose start dates we have not yet confirmed began operations in the 1860s as well.

Table 15
Longevity of leading Ontario industrial firms operating in 1871

Start Decade	Pre-1830	1830s	1840s	1850s	1860s	1870	Unknown
End Decade							
Unknown							3
1870s				1	2		
1880s			2	8	6	1	
1890s			2	9	3		
1900s					1		1
1910s		1		2			
1920s	1	1	1		2		
1930s							
1940s					1		
1950s					1	1	
1960s					2	1	
1970s							
Post-1980		1	2	3	1		

Only seven of the largest industrial businesses identified in 1871 survived a century later, in the same general locations and industry groups. These included the two distilleries (consolidated into one company in 1927 but both still operating *in situ*), the Globe and Citizen newspapers, and Hunter Rose the book publishers (which would cease operations in the early 1980s). Two

⁴⁷ The Lumber Trade of the Ottawa Valley (Ottawa: Times Steam Printing & Publishing Company, 1872).

⁴⁸ The rolling mills were directly stimulated by the railway boom as virtually their only product was iron rail. The railway boom of the 1850s also provided a good many entrepreneurs in our group with the capital with which to invest in and develop new product lines by 1871.

makers of engines and machinery continued to operate in that sector and in their original locations -- Waterous (now Koehring Canada Ltd) of Brantford, and Goldie and McCulloch (now Babcock and Wilcox) of Galt (Cambridge).

Other enduring businesses that lasted nearly as long were three metal fabricating and engineering concerns. The Canadian Engine Company of Kingston began in 1850 and ceased in 1968. The Welland Vale Manufacturing Company of St Catharines was first established in 1869 and ceased in 1966. James Smart's ironware and stove factory started at Brockville in 1854 and, as Canada Foundries and Forgings, closed in 1965. The two woolen mills lasted at least 80 years after the 1871 census -- Rosamond's of Almonte which operated from 1857 to 1952, and Dominion Woollens which started as the Randall Farr Company at Hespeler in 1864 and closed in 1958. Well under half the largest industrial firms identified in 1871 survived to 1900 or later. The high rates of failure in the 1880s and 1890s are reflected in Table 14 and elaborated in Table 15. It is likely that the three businesses whose end dates we have not yet confirmed also failed before 1900.

Some industry types were more enduring than others, as Table 16 shows. Distillery businesses clearly lasted longest, with printing and publishing, metal fabricating, engine and machinery firms and woolen mills doing better than the average for all industrial leaders. Firms in the oil refining, rolling mill, boots and shoes, sewing machine and cotton textile sectors were the least enduring, with average durations of 22 years or less. Businesses making agricultural implements, furniture, railway equipment and clothing businesses averaged 40 to 45 years in duration. The nine saw mills had an average life of 56 years, slightly more than the overall mean duration of all sixty selected firms.

Table 16
Average longevity of leading Ontario industrial firms operating in 1871

Major Industrial Group	N	Mean # Years
Raft building	1	78
Flour mill	1	36
Distilleries	2	145
Boots and shoes	5	22
Cotton mills	2	30
Woollen mills	4	66
Clothing	2	41
Saw mills	9	56
Furniture	4	42
Paper mill	1	61
Printing and publishing	5	86
Rolling mills	2	18
Metal fabricating	4	68
Agricultural implements	3	42
Engine/machinery works	6	69
Sewing machines	3	22
Railway equipment	4	44
Oil refineries	2	16
All firms	60	54

Various factors should be considered in trying to explain trends in business starts, failures and closures, survival and longevity. General patterns of business starts and closures can be seen in the context of business cycles, a boom of new enterprises stimulated in the railway era of the 1850s, and large numbers of these businesses failing in the depressed decades of the 1880s and 1890s. None of the selected sixty firms failed in the 1930s; presumably businesses that survived till that decade had developed the ability to adapt to the circumstances of depression. Fires and other catastrophes were responsible for some business failures, though sometimes disasters caused the community in which a firm was located to rally in support of a vital local employer. In a time when most businesses were unincorporated and run by the entrepreneur himself, his untimely death or lack of a successor could also mean failure or closure of the enterprise. The concept of the product cycle is also worth exploring as a means of explaining the rise and disappearance of some industrial sectors.⁴⁹

A group of large businesses such as those identified here might be used a sample for comparative analysis in greater depth of the full meaning of industrial leadership.⁵⁰ Important questions include the differences in entrepreneurial and managerial strategies in response to technological change and new market opportunities. How important were product specialization and marketing innovations in the rise of middle ranking businesses in 1871 to undisputed leadership later. Can they, for example, explain the success of Massey Manufacturing Company from overall 132nd place among Ontario firms in 1871, in overtaking such enterprises as the Patterson Brothers and Joseph Hall in the 1880s and becoming the undisputed leader in the agricultural machinery sector by the 1890s?

CONCLUSION

The 1871 manuscript census data for industrial establishments offer Canadian business historians the opportunity to see individual firms in comparative context at a time of transition in technology, business organization and work discipline. The exercise of identifying the largest firms of 1871 has shown the value of using a composite index rather than a single variable. A group of leading firms may also constitute a kind of sample of significant businesses, about which we may seek information from other sources as a basis for generalizations about the scale of operations, the use of technology, the nature of business organization and interrelationships among entrepreneurs.

⁴⁹ For a useful review of the concept of the product cycle, see: M. Taylor, "Enterprise and the Product-Cycle Model," in B. van der Knapp and E. Weve, eds. New Technology and Regional Development (Croom Helm, 1987): 75-93.

⁵⁰ Company records for any of the sixty enterprises are elusive but company histories for a few of them are noted in Paul Craven, Anne Forrest, and Tom Traves, Canadian Company Histories: A Checklist (York University, Social Science Division, c1980).

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It is very simple, and so constructed that it cannot wear nor break, and is the only perfect Set Motion ever invented.

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APPENDICES

Abbreviated code names for variables in the CANIND71 database or for derived indices are used in various tables in this report. A brief explanation of each code name follows:

AVWAGE:	Average monthly wage per worker in a firm, place or type of industry.
CDID:	Census district number used in 1871 census.
CDISTRICT:	Census district name used in 1871 census.
CED:	Census enumerator's division, a small part of a census district.
COMMENTS:	Additional remarks or comments for a firm entered in manuscript schedule.
EMPBOY:	Boys (males under 16 years) employed in industrial activity.
EMPGIRL:	Girls employed (females under 16 years) in industrial activity.
EMPMEN:	Men (males over 16 years) employed in industrial activity.
EMPWOM:	Women (females over 16 years) employed in industrial activity.
END:	Year by which each of sixty largest businesses ceased operations.
FIXCAP:	Value of fixed capital reported by proprietors.
FORCE:	Units (in "horse power" equivalents) of non-manual power reported by proprietors.
INCORP:	Year of legal incorporation of each of sixty largest industrial firms, if applicable.
MONTH:	Number of working months in year.
ORIGIN:	Ethnic origin of entrepreneur of one of sixty largest Ontario firms.
PROD1:	Named type of product, first to Nth, as numbered.
PROPRIOR:	Name of proprietor as stated in census schedules.
PQUANT1:	Quantity of named product, first to Nth, as numbered.
PUNIT1:	Unit of measurement of named product, first to Nth, as numbered.
PVALUE1:	Value of named product, first to Nth, as numbered
RANK:	Overall rank within Ontario of sixty largest firms.
RAWMAT1:	Named type of raw material, first to Nth, as numbered.
RQUANT1:	Quantity of named raw material, first to Nth, as numbered.
RUNIT1:	Unit of measurement of named raw material, first to Nth, as numbered.
RVALUE1:	Value of named raw material, first to Nth, as numbered.
SEC:	Major industry group, derived from combinations of SIC codes.
SIC:	Standard Industrial Classification.
START:	Beginning date of each of sixty largest Ontario firms.
SUMPROC:	Value of industrial production (\$).
SUMRAWC:	Value of raw materials used in industry (\$).
TOTEMP:	Total number of employees, the sum of EMPMEN, EMPWOM, EMPBOY and EMPGIRL.
TYPE:	Type of leading industrial firm in Ontario in 1871, based on whether it ranked among the top 100 firms in fixed capital (FIXCAP), number employed (TOTEMP), value of production (SUMPROC) or value added in manufacturing (VADD).
TYPEEST:	Type of establishment as stated by enumerator in census schedules.
TYPEPOW:	Type of power reported: steam, water, horse, W/S (water/steam).
VADD:	Value added in manufacturing (\$) = production \$ - raw materials \$.
WAGES:	Wages paid to industrial workers (\$).

Appendix A-1

LEADING ONTARIO FIRMS BY MEASURE OF VALUE OF OUTPUT, 1871

CDID	CED	PROPRIOR	TYPEEST	SIC	FIXCAP	TYPEPOW	FORCE	TOTEMP	WAGES	SUMRAWC	SUMPROC	VADD
0047	A-3	GOODERHAM & WORTS	DISTILLERY	109-D	350000	STEAM	116	150	60000	450000	1470000	1020000
0001	J-2	WALKER HIRAM	DISTILLER/MALSTER	109-D	47200	STEAM	45	106	45700	240000	1114982	874982
0024	B-3	HAMILTON ROLLING	ROLLING MILLS	291-R	70000	STEAM	400	225	80000	410000	680000	270000
0021	B-1	NORRIS JAMES	FLOUR MILLS	105	45000	WATER	120	25	100000	575000	640000	65000
0047	A-3	HAMILTON WILLIAM	FOUNDRY/MACHINE S	315/326	100000	STEAM	60	200	100000	35000	620000	585000
0009	C-6	ENGLEHART & CO	PETROLEUM OIL RFN	365	50000	STEAM	30	50	25000	260000	540000	280000
0075	C	HAMILTON BROS	SAW MILL	251	100000	WATER	1500	168	27000	400000	540000	140000
0046	A-1	HAY R & CO	CABINETS/UPHOLSTE	261	400000	STEAM	40	430	120000	350000	500000	150000
0047	A-4	GZOWSKI C & CO	ROLLING MILL	291-R	100000	STEAM	250	200	72000	387000	500000	113000
0025	G-1	PARKYN JAMES ?	GRIST/FLOUR MILL	105	15000	W/S	75	8	2650	465654	488726	23072
0069	C-1	BENSON W T	GRIST MILL	105	20000	WATER	34	2	900	95000	460000	365000
0021	B-4	NEELON SYLVEST	FLOUR MILL	105	25000	WATER	150	20	8000	385000	447120	62120
0022	C-1	DAVIS JOHN T	PORK PACKING EST	101-P/101	30000	STEAM	6	50	120000	294250	412000	117750
0046	C-1	ALDWELL & CO	BREWERY/MALT HOUS	109-B/108-M	120000	STEAM	25	40	10000	113500	405000	291500
0022	C-1	WILLIAMS JAMES &	OIL REFINERY	365	50000	STEAM	50	50	200000	220000	400000	180000
0077	B-2	BRONSON & WESTON	SAW MILL	251	350000	WATER	2500	300	70000	240000	360000	120000
0024	E-2	SANFORD & MCINNES	CLOTHING MF	242	40000	WATER	455	60000	250000	350000	350000	100000
0080	B	ROSAMOND B & W	WOOLEN FACTORY	182	200000	WATER	160	209	48600	270000	350000	80000
0010	D	MCCORMICK THOMAS	BISCUIT/CANDY MF	107/108-C	16000	STEAM	6	33	10000	299750	339875	40125
0077	B-2	PERLEY & PATTEE	SAW MILL	251	150000	WATER	500	250	70000	240000	330000	90000
0015	D-1	GRAND TRUNK RAILW	REPAIR SHOP	326	435000	STEAM	30	315	182000	82000	326000	244000
0048	E-2	GIBBS & BRO	FLOUR MILL	105	60000	WATER	70	20	60000	300000	325000	25000
0066	F	CANADIAN ENGINE C	RAILWAY CARS/ENGI	326/315-E	200000	STEAM	20	173	75000	200988	306000	105012
0016	C-2	WHITLAW CHARLES	FLOUR MILL	105	40000	WATER	53	42	13000	270000	300000	30000
0034	B	FRASER J & CO	FLOUR MILL/DISTIL	105/109-D	30000	WATER	70	9	3000	270000	300000	30000
0046	A-1	SESSIONS/TURNER/C	BOOTS/SHOE MF	174	30000	STEAM	15	510	100000	180000	300000	120000
0047	A-1	HALLAM JOHN	HIDE/CURING FACTO	172	46000	WATER	5	5	30000	265600	300000	34400
0048	E-2	HALL JOSEPH & CO	ENGINES/AGRC IMPL	315-E/311	200000	STEAM	50	266	125000	56600	300000	243400
0047	A-4	MORRISON JOHN	PORK CURING EST	101-P	11000	STEAM	15	32	5376	168000	276300	108300
0077	B-2	BALDWIN A H	SAW MILL	251	90000	WATER	250	274	50000	180000	276000	96000
0046	C-1	DICKEY NEIL &	ENGINES/FOUNDRY	315-E/326	120000	STEAM	50	230	80000	112900	275600	162700
0033	C-4	GOLDIE JAMES	FLOUR MILL/COOPER	105/259-C	30000	WATER	160	38	15000	260000	275000	15000
0017	F-2	MCQUARRIE & THORB	GRIST/FLOUR MILL	105	10000	WATER	400	5	20000	266500	266500	0
0039	A-3	GOODERHAM & WORTS	FLOUR MILL	105	50000	WATER	80	35	16000	175000	254000	79000
0003	F-1	DAY D P W	SAW MILL	251	6000	STEAM	20	12	3000	100000	250000	150000
0046	A-3	BOULTON HENRY JOH	FLOUR MILL	105	30000	STEAM	80	6	2500	200000	250000	50000
0047	A-1	BEARD BROS & CO	CANADIAN STOVE WO	307-S	20000	STEAM	15	100	25000	46100	250000	203900
0047	A-1	DAMER KING & CO	BOOT/SHOE FACTORY	174	20000	STEAM	15	191	52000	150000	250000	100000
0047	A-1	BEATY JAMES	PUBLISHING/PRINTE	289	165000	STEAM	20	80	60000	100000	250000	150000
0077	B-2	BOOTH JAMES R	SAW MILL	251	400000	WATER	250	200	60000	180000	250000	70000
0069	B-2	WISER & EGGART	DISTILLERY	109-D	30000	STEAM	100	38	19000	70000	240000	170000
0004	D-2	COCHRANE THOMAS	CARBON OIL CO	365	20000	STEAM	60	6	2500	46100	250000	203900
0015	D-2	PLEWES DAVID	FLOUR MILL	105	20000	WATER	140	14	5300	17500	229000	229000
0071	D	GIBSON WILLIAM	FLOUR/GRIST MILL	105	18000	WATER	52	8	2800	200000	225000	225000
0019	G	THOMAS W H	DISTILLERY	109-D	35000	STEAM	21	7500	47000	224639	177639	177639
0024	B-1	NASH SAMUEL	PORK CURER	101-P	10000	STEAM	100	38	19000	70000	220000	220000
0047	A-1	THE GLOBE	PUBLISHING OFFICE	289	60000	STEAM	80	80	70000	110000	110000	110000
0060	B	GILMOUR & CO	SAW MILL	251	60000	STEAM	110	170	36000	154000	220000	66000
0024	E-2	WANZER R M & C	SEWING MACHINE MF	315-S	58000	STEAM	40	275	86000	65000	210000	145000
0033	C-3	GUELPH SEWING M C	SEWING MACHINE FC	315-S	65000	STEAM	12	180	75000	62000	204800	142800
0023	C-2	YOUNG & LAW & CO	COTTON FACTORY	181	250000	W/S	90	90	29500	110000	200000	90000

LEADING ONTARIO FIRMS BY MEASURE OF VALUE OF OUTPUT, 1871

CDID	CED	PROPRIOR	SIC	TYPEEST	FIXCAP	TYPEPOW	FORCE	TOTEMP	WAGES	SUMRAWC	SUMPROC	VADD
0024	A-1	WILSON BOWMAN & C	SEWING MACHINE MF	315-S	8000 STEAM	15	131	60000	50000	200000	150000	
0024	E-2	MCPHERSON JOHN &	BOOT/SHOE MF	174	70000 STEAM	25	175	50000	120000	200000	80000	
0031	G	RANDALL & FARR &	WORSTED/WOOLEN MI	182	77000 WATER	100	163	35000	140000	200000	60000	
0046	A-1	ROBERTSON & COOK	PRINTING OFFICE	289	50000 STEAM	10	95	70000	100000	200000	100000	
0047	A-2	DAVIES WILLIAM &	PORK PACKING HOU	101-P	6000 STEAM	30	21	10000	189000	200000	110000	
0051	B-3	KING J G	FLOUR MILL	105	4000 WATER	80	7	3000	175000	200000	25000	
0073	D-1	WARWICK JOHN	WOOLEN FACTORY	182	100000 WATER	100	145	18000	110000	200000	90000	
0077	B-2	MCKAY THOMAS	FLOUR/OATMEAL MIL	105/105-O	40000 WATER	40	16	5000	178880	194854	15974	
0009	C-1	HILLIARD & SAWNBY	GRIST/FLOUR MILL	105	25000 WATER	60	7	2064	162000	192000	30000	
0032	E-2	RANDALL GEORGE &	DISTILLERY	109-D	15000 STEAM	25	7	2700	50000	186000	136000	
0077	B-2	YOUNG LEVI	SAW MILL	251	100000 WATER	100	100	20000	150000	182000	32000	
0009	C-6	WATERMAN H & I	PETROLEUM REFININ	365	30000 STEAM	15	20	8000	72000	180000	108000	
0015	D-3	WATTS ALFRED	FLOUR MILL	105	10000 WATER	50	5	2000	160000	180000	20000	
0031	D-3	GOLDIE/MCCULLOCH/	ENGINE/MACHINE WO	315-E/315	100000 STEAM	50	203	65000	27700	180000	152300	
0039	A-3	BARBER & BROS	CLOTH FACTORY	182	150000 WATER	150	129	28000	90000	175000	85000	
0033	C-1	ALLAN DAVID	DISTILLERY	109-D	35000 STEAM	40	10	5000	130110	170939	40829	
0048	E-2	GIBBBS WM H	CABINET FACTORY	261	60000 STEAM	50	181	55000	100000	165000	65000	
0047	A-1	DAVIDSON SCOTT &	PORK PACKING/CURRI	101-P	7000	3	3	1800	150000	162000	120000	
0021	A-3	RIORDAN JOHN	PAPER MILLS	271	156000 WATER	200	100	30000	70000	160000	90000	
0046	B-1	HUNTER & ROSE & C	PRINTER/BINDERY	286/287-B	400000 STEAM	25	173	48000	50000	160000	110000	
0047	A-1	CHILD'S & HAMILTON	BOOT/SHOE FACTORY	174	40000	.	.	192	65000	85000	75000	
0047	B-1	PATTERSON JOHN & C	BOOT/SHOE MF	174	17000	.	.	154	31200	100000	60000	
0067	G-2	GORREL JAMES	SAW MILL	251	6000 WATER	50	40	4600	100000	160000	150000	
0044	B-5	ROE ALFRED ?	WOOL FACTORY/TAI	182/243	12350 WATER	30	30	5500	159500	159500	110000	
0010	C-1	MOORHEAD GEORGE	CABINET MANUFACTO	261	100000 STEAM	10	68	30000	40000	150000	84000	
0021	A-3	GORDON & MACKAY	LYBSTER COTTON MI	181	150000 WATER	250	200	36000	66000	150000	9400	
0021	B-1	NORRIS & CO	FLOUR MILLS	105	10000 WATER	50	9	2000	140600	150000	10000	
0025	F-1	LEE WILLIAM	FLOUR MILL	105	6000 WATER	50	3	1280	150000	150000	0	
0029	E-3	THOMPSON & WILLIA	AGRIC WORKS/ENGINE	311/315-E	25000 STEAM	30	106	40000	50000	150000	100000	
0047	A-2	CRAWFORD D & CO	SOAP FACTORY	376	5000 STEAM	25	28	8400	120000	150000	30000	
0054	B-2	CROSSAN JAMES	RAILWAY CAR MF	326	1000	.	.	40	12000	150000	32000	
0065	B-2	PENITENTIARY	BOOT/SHOE MF	174	50000	.	.	125	15000	150000	150000	
0065	C	CALVIN & BRECK	RAFT BUILDING	031	320000	.	.	156	40000	224000	127600	
0076	F	McCLEMENT W & CO	FLOUR/OATMEAL MIL	105/105-O	40000 WATER	75	10	2500	100000	150000	50000	
0077	E-2	MCCLAREN J & CO	SAW MILL	251	40000 WATER	100	53	18000	80000	150000	70000	
0082	E	SUPPLE MARTIANNE	SAW MILL	251	10000 WATER	20	22	7000	10000	150000	140000	
0061	B-1	RATHBUN H B & S	SAW MILL	251	50000 STEAM	150	311	39250	77900	140754	62854	
0004	G-1	BLACK STAR OIL WO	OIL REFINERY	365	100000 STEAM	12	11	5700	37500	140000	102500	
0024	D-1	GURNEY E & C	IRON FOUNDER	307-S/294	20000 STEAM	20	101	45000	45200	140000	94800	
0060	A-1	PAGE A S & CO	SAW MILL	251	20000 STEAM	120	125	30000	105000	140000	35000	
0068	B	SMART JAMES	FOUNDRY	309/307-S	32000 STEAM	32	160	45000	50000	140000	90000	
0052	C-3	NEEDLER WILLIAM	GRIST MILL	105	24000 WATER	180	7	2800	120000	139996	19996	
0044	B-5	GOODERHAM ALFRED	FLOUR MILL	105	10000 WATER	25	8	2500	100000	138000	38000	
0009	C-6	PLEWES & CROW	FLOUR/GRIST MILL	105	6000 WATER	30	5	1200	130000	137772	7772	
0021	B-1	TUTTLE DATE & ROD	AGRIC HAND TOOLS	306	75000 WATER	350	120	55000	36000	137000	101000	
0031	D-1	BLAIN RICHARD	FLOUR/GRIST MILL	105	24000 WATER	60	7	2500	116000	137000	210000	
0019	K	MACKLEM/KIRKPATRICK	TANNERY	172	100000 STEAM	25	23	9000	75000	135000	60000	
0021	A-3	VON POHENHOFF A R	OIL REFINERY	365	25000 STEAM	20	15	8000	40000	135000	95000	
0046	A-3	THOMPSON SMITH &	SAW MILL	251	W/S	200	240	72000	72000	135000	135000	
0050	B-1	MCARTHUR F F	FURNITURE MF CO	261	50000 STEAM	40	175	58000	50000	135000	85000	
0054	A-1	MCDougall & LUDGJA	SAW MILL	251	152960 STEAM	100	225	52800	67500	135000	67500	
0054	C-3	MC FARLANE & CO	DISTILLERY	109-D	30000 STEAM	40	20	7250	48000	135000	87000	

7036510
 11537 10955 3347730 15402132 27283149 11436517

Appendix A-2

LEADING ONTARIO FIRMS BY MEASURE OF NUMBER EMPLOYED, 1871

CDDID	CED	PROPRIOR	TYPEEST	SIC	FIXCAP	TYPEPOW	FORCE	TOTEMP	WAGES	SUMPROC	VADD
0024	B-3	GREAT WESTERN RAILWAY	RL CARS/LOCOMOTIV	326	· STEAM	·	984	500000	·	·	·
0046	A-3	NORTHERN RAILWAY	RAILWAY WORK SHOP	326	6568000 STEAM	139	561	215808	34533	120000	·
0046	A-1	SESSIONS/TURNER/C	BOOTS/SHOE MF	174	30000 STEAM	15	510	100000	180000	300000	100000
0024	E-2	SANFORD & MCINNES	CLOTHING MF	242	40000 STEAM	·	455	60000	250000	350000	100000
0046	A-1	HAY R & CO	CABINETS/UPHOLSTE	261	400000 STEAM	40	430	120000	350000	500000	150000
0015	D-1	GRAND TRUNK RAILW	REPAIR SHOP	326	435000 STEAM	30	315	182000	82000	326000	244000
0061	B-1	RATHBUN H B & S	SAW MILL	251	500000 STEAM	150	311	39250	77900	140754	62854
0077	B-2	BRONSON & WESTON	SAW MILL	251	350000 WATER	2500	300	70000	240000	360000	120000
0024	E-2	WANZER R M & C	SEWING MACHINE MF	315-S	580000 STEAM	40	275	86000	65000	210000	145000
0077	B-2	BALDWIN A H	SAW MILL	251	900000 WATER	250	274	50000	180000	276000	96000
0048	E-2	HALL JOSEPH & CO	ENGINES/AGRC IMPL	315-E/311	200000 STEAM	50	266	125000	56600	300000	243400
0024	E-2	KEMPSTER C W & T	BUILDER/CONTRACTO	351-B/421-B	250000 STEAM	32	250	75000	21500	103500	82000
0077	B-2	PERLEY & PATTEE	SAW MILL	251	150000 WATER	500	250	70000	240000	330000	90000
0046	A-3	THOMPSON SMITH &	SAW MILL	251	· W/S	200	240	72000	·	135000	·
0046	C-1	DICKEY NEIL &	ENGINES/FOUNDRY	315-E/326	1200000 STEAM	50	230	80000	112900	275600	1622700
0024	B-3	HAMILTON ROLLING	ROLLING MILLS	291-R	700000 STEAM	400	225	80000	410000	680000	270000
0054	A-1	MCDOUGALL & LUDGAR	SAW MILL	251	152960 STEAM	100	225	52800	67500	135000	67500
0080	B	ROSAMOND B & W &	WOOLEN FACTORY	182	200000 WATER	160	209	48600	270000	350000	80000
0089	A	WEST CANADA MININ CO	MINING	059	·	·	206	70968	128500	·	·
0031	D-3	GOLDIE/MCCULLOCH/	ENGINE/MACHINE WO	315-E/315	1000000 STEAM	50	203	65000	27700	180000	152300
0046	A-1	HENDERSON & BOSTW	HAT/BONNET MF	249-H	500000 STEAM	15	201	14400	24700	80000	55300
0077	B-2	BOOTH JAMES R	SAW MILL	251	400000 WATER	250	200	60000	180000	250000	70000
0021	A-3	GORDON & MACKAY	LYBSTER COTTON MI	181	1500000 WATER	250	200	36000	66000	1500000	84000
0047	A-4	GZOWSKI C & CO	ROLLING MILL	291-R	1000000 STEAM	250	200	72000	387000	500000	113000
0047	A-3	HAMILTON WILLIAM	FOUNDRY/MACHINE S	315-S/326	1000000 STEAM	60	200	100000	35000	620000	585000
0047	A-1	CHILDS & HAMILTO	BOOT/SHOE FACTORY	174	400000 STEAM	·	192	65000	85000	160000	75000
0047	A-1	DAMER KING & CO	BOOT/SHOE FACTORY	174	200000 STEAM	15	191	52000	150000	250000	100000
0048	E-2	GIBBS WM H	CABINET FACTORY	261	600000 STEAM	50	181	55000	100000	165000	65000
0033	C-3	GUELPH SEWING M C	SEWING MACHINE FC	315-S	650000 STEAM	12	180	75000	62000	142800	142800
0050	B-1	MCARTHUR F F	FURNITURE MF CO	261	500000 STEAM	40	175	58000	50000	135000	85000
0024	E-2	MCPHERSON JOHN &	BOOT/SHOE MF	174	700000 STEAM	25	175	50000	120000	200000	80000
0066	F	CANADIAN ENGINE C	RAILWAY CARS/ENGI	326/315-E	200000 STEAM	20	173	75000	200988	306000	105012
0046	B-1	HUNTER & ROSE & C	PRINTER/BINDERY	286/287-B	40000 STEAM	25	173	48000	50000	160000	110000
0060	B	GILMOUR & CO	SAW MILL	251	600000 STEAM	110	170	36000	154000	220000	66000
0075	C	HAMILTON BROS	SAW MILL	251	1000000 WATER	1500	168	27000	400000	540000	140000
0079	J	GILLIES & MCLAREN	SAW MILL	251	200000 WATER	120	163	35000	75000	120000	45000
0031	G	RANDALL & FARR &	WORSTED/WOOLEN MI	182	770000 WATER	100	163	35000	140000	200000	60000
0068	B	SMART JAMES	FOUNDRY	309/307-S	320000 STEAM	32	160	45000	50000	140000	90000
0065	C	CALVIN & BRECK	RAFT BUILDING	031	320000 STEAM	·	156	40000	22400	150000	127600
0047	B-1	PATERSON JOHN & C	BOOT/SHOE MF	174	170000 STEAM	·	154	31200	100000	160000	60000
0056	C-1	DICKSON S	SAW MILL	251	500000 WATER	116	150	60000	450000	1470000	1020000
0047	A-3	GOODERHAM & WORTS	DISTILLERY	109-D	350000 STEAM	·	154	18000	110000	200000	90000
0073	D-1	WARWICK JOHN	WOOLEN FACTORY	182	1000000 WATER	100	145	29500	110000	200000	90000
0023	C-2	YOUNG & LAW & CO	COTTON FACTORY	181	250000 W/S	90	143	50000	40000	113397	73397
0077	C-1	TAYLOR ISAAC B	PRINTING EST	289	600000 STEAM	25	140	29635	138	38497	·
0068	C	B & O RAILWAY CO	CAR FACTORY	326	600000 STEAM	·	150	26000	54000	120000	66000
0042	B	HOTCHKISS & PECKH	SAW MILL	251	300000 STEAM	150	133	60000	50000	200000	150000
0024	A-1	BOWMAN WILSON & C	SEWING MACHINE MF	315-S	80000 STEAM	15	131	60000	50000	200000	150000
0047	A-1	BARKER GEORGE	STRAW HAT FACTORY	249-H	100000 STEAM	8	130	30000	62000	32000	32000
0039	A-3	BARBER & BROS	CLOTH FACTORY	182	150000 WATER	150	129	28000	90000	175000	85000
0046	A-1	CAMPBELL J & SONS	PUBLISHER/BINDERY	289/287-B	250000 STEAM	15	126	250000	60000	100000	40000

LEADING ONTARIO FIRMS BY MEASURE OF NUMBER EMPLOYED, 1871

63

CDID	CED	PROPRIOR	SIC	TYPEEST	FIXCAP	TYPEPOW	FORCE	TOTEMP	WAGES	SUMRAWC	SUMPROC	VADD
0060	A-1	PAGE A S & CO	251	SAW MILL	20000	STEAM	120	125	30000	105000	140000	35000
0044	B-2	PATTERSON BROS	311	AGRC MACHTNE WORK	50000	W/S	30	125	50000	30650	113630	82980
0065	B-2	PENITENTIARY	174	BOOT/SHOE MF	50000		125	15000	150000		150000	
0047	A-1	LIVINGSTON/JOHNST CLOTHING FACTORY	242		2000		124	26000	60000		110000	50000
0010	C-1	MCPHERSON JOHN & BOOTS/SHOES	174		25000	STEAM	50	122	45000	72000	120000	48000
0024	C-2	BECKETT F G & C ENGINE/BOILER MF	315-E/301		100000	STEAM	350	120	40000	40000	100000	60000
0021	B-1	TUTTLE DATE & ROD AGRC HAND TOOLS	306		75000	WATER	40	118	55000	36000	137000	101000
0015	D-2	WATEROUS C H & C ENGINES/MACHINERY	315-E/315		57000	STEAM	52	116	40573	19700	120000	100300
0022	E-3	ANCASTER KNITTING WOOLEN MILL	239		24000	W/S	1	116	13570	2512	17266	14754
0065	B-2	PENITENTIARY STONE MASONRY	421-S/353		20000			116	20000	60000	100000	40000
0047	A-1	WALKER R & SONS CLOTHING/DRY GOOD	242		60000	W/S	80	112	25000	72000	120000	48000
0054	B-3	FRASER & CO WOOLEN MILL	182		15000	WATER	120	110	15000	50000	100000	50000
0058	A	SCOTT W A SAW MILL	251		100000	WATER	500	110	14300	72000	90000	18000
0053	B-3	SMITH R C & CO SAW MILLS	251		25000	STEAM	30	106	40000	50000	150000	100000
0029	E-3	THOMPSON & WILLIA AGRC WORKS/ENGINE	311-315-E		47200	STEAM	45	106	24000	114982	874982	
0001	J-2	HIRAM DISTILLER/MALISTER	109-D		35000	STEAM	50	105	30000	32500	70000	37500
0015	D-1	BUCK WILLIAM IRON FOUNDRY	307-S/311		70000	STEAM	60	103	42000	50500	111400	69900
0013	F-2	NOXON BROS FOUNDRY	311-315		45000	WATER	140	102	35000	52000	100000	48000
0052	E-1	BOYD M ? SAW MILL	251		20000	STEAM	20	101	45000	45200	140000	94800
0024	D-1	GURNEY E & C IRON FOUNDER	307-S/294		10000	STEAM	15	100	25000	60000	90000	30000
0047	A-1	BEARD BROS & CO CLOTHING/MANTLE F	242-244		20000	STEAM	60	100	46100	250000	203900	
0046	B-1	BURKE WILLIAM SASH/BLIND FACTOR	254		100000	STEAM	75	100	26000	15000	51250	36250
0086	C-1	CLARKE & WHITE & LUMBER MERCHANTS	251		327285	STEAM	20	101	45000	45200	140000	94800
0081	B	MCLAUGHLIN BROS SAW MILL	251		50000	WATER	260	100	15000	90000	30000	30000
0021	A-3	RILDAN JOHN PAPER MILLS	271		156000	WATER	200	100	30000	70000	110000	200000
0041	G-2	WHIPPER EDWARD SAW MILL	251		25000	STEAM	80	100	15000	30000	160000	90000
0077	B-2	YOUNG LEVI SAW MILL	251		100000	WATER	100	100	150000	150000	30000	320000
0056	D-2	HILLIARD GEORGE SAW/GRIIST MILL	251/105		20000	WATER	150	96	30000	65000	110000	45000
0060	C-3	RATHBUN H B SAW/SASH MILL	251/254		50000	STEAM	95	17000	45000	81000	81000	360000
0046	A-1	ROBERTSON & COOK PRINTING OFFICE	289		36000	STEAM	10	95	100000	200000	200000	100000
0047	B-1	GURNEY E & C FOUNDRY	307-S/294		30000	STEAM	25	93	25000	75000	480000	530000
0039	E-2	HAGGERT BROS FOUNDRY/AGRC IMPL	311-307-S		30000	STEAM	20	93	31500	50500	103500	103500
0044	B-5	ABELL JOHN AGRC WKS/FLOUR MI	311-105		42000	STEAM	80	90	35000	43000	119000	76000
0024	D-2	SAWYER S D & C AGRC IMPLEMENTS	311		100000	STEAM	22	90	45000	73000	125000	520000
0086	A-1	BEATTY J W & CO SAW MILL	251-251-S		100000	WATER	40	88	18000	12000	30000	18000
0046	D-3	MCBANE JAMES CARPENTER/DOOR FC	254		12000	STEAM	25	88	20000	4800	30000	252000
0046	A-1	TAILUP THOS & CO CLOTHING MF	243		21600			88	17000	58000	83000	250000
0042	H	CHRISTIE A R SAW MILL	251		100000	WATER	250	87	25000	40000	85000	45000
0047	B-1	HUGHES P & B B TAILOR/MILLINERY	243-249-M		24000			84	18000	18000	60000	420000
0047	A-1	HOLMES JOHN BOOT/SHOE FACTORY	174		4000			83	26000	60000	100000	400000
0024	C-2	RUTHERFORD H & CO GLASS MANUFACTURE	356		15000	STEAM	10	83	42500	40000	85000	64950
0042	H	HOTCHKISS/HEWSON SAW MILL	251		75000	WATER	250	82	25000	40000	85000	45000
0021	B-1	SHICKLUNA LEWIS SHIP BUILDING YAR	327		20000	WATER	50	82	25000	15000	48000	33000
0077	A-2	SMILLIE BOURNE & BANK NOTE COMPANY	286-B		100000	STEAM	100000	82	35000	20000	60000	400000
0047	A-1	BEATTY JAMES PUBLISHING/PRINTING	289		165000	STEAM	20	80	60000	100000	250000	150000
0054	A-1	CAMPBELL A H & CO SAW MILL	251		143000	STEAM	120	80	14000	75000	110000	350000
0046	A-1	EVAN BARCLAY BOOT/SHOE MF	174		12000			80	15000	50000	75000	25000
0053	B-3	GREEN & ELLIS SAW MILL	251		40000	STEAM	140	80	10400	20000	32000	12000
0023	C-2	MCKECHNIE & BERTR CANADA TOOL WORKS	315-M/315		30000	STEAM	35	80	30000	11640	60000	48360
0010	D	MCMECHAN & CO BOOT/SHOE FACTORY	174		25000			80	26000	29000	29000	36000
0047	A-1	REID C P & CO CIGAR MANUFACTORY	153		1500	STEAM	16	80	13500	3750	73200	36150
0047	A-2	SCALES J & CO TOBACCO WORKS	153		25000	STEAM	80	70000	105000	105000	200000	200000
0047	A-1	THE GLOBE PUBLISHING OFFICE	289		60000			80	110000	110000	220000	110000
					=====	=====	=====	=====	=====	=====	=====	=====
					12005	17110	5142454	9001423	19174776	19174776	9755889	9755889
					14477546							

Appendix A-3

LEADING ONTARIO FIRMS BY MEASURE OF FIXED CAPITAL, 1871

64

CDID	CED	PROPRIOR	TYPEEST	SIC	FIXCAP	TYPEPOW	FORCE	TOTEMP	WAGES	SUMRAWC	SUMPROC	VADD
004 6	A-3	NORTHERN RAILWAY	RAILWAY WORK	SHOP	326	6568000	STEAM	139	561	215808	34533	244000
001 5	D-1	GRAND TRUNK RAIL	REPAIR SHOP		326	435000	STEAM	30	315	182000	82000	326000
007 7	B-2	BOOTH JAMES R	SAW MILL		251	400000	WATER	250	200	60000	180000	250000
004 7	A-3	CONSUMERS GAS CO	GAS WORKS		574	400000	STEAM	10	51	19000	33000	124000
004 6	A-1	HAY R & CO	CABINETS/UPHOLSTE		261	400000	STEAM	40	430	120000	350000	500000
007 7	B-2	BRONSON & WESTON	SAW MILL		251	350000	WATER	2500	300	70000	240000	360000
004 7	A-3	GOODERHAM & WORTS	DISTILLERY		109-D	350000	STEAM	116	150	60000	450000	1020000
008 6	C-1	CLARKE & WHITE &	LUMBER MERCHANTS		251	327285	STEAM	75	100	25000	17500	42500
004 6	B-1	METRO WATER WORKS	WATER WORKS		576	300000	W/S	90	143	29500	110000	200000
002 3	C-2	YOUNG & LAW & CO	COTTON FACTORY		181	250000	STEAM	20	173	75000	200988	306000
006 6	F	CANADIAN ENGINE C	RAILWAY CARS/ENGI		326/315-E	200000	STEAM	50	266	125000	56600	300000
004 8	E-2	HALL JOSEPH & CO	ENGINES/AGRIC IMPL		315-E/311	200000	STEAM	160	209	48600	270000	350000
008 0	B	ROSAMOND B & W &	WOOLEN FACTORY		182	200000	WATER	20	80	60000	100000	150000
004 7	A-1	BEATTY JAMES	PUBLISHING/PRINTE		289	165000	STEAM	200	100	30000	70000	160000
002 1	A-3	RIORDAN JOHN	PAPER MILLS		271	156000	WATER	100	225	52800	67500	135000
005 4	A-1	MCDOUGALL & LUDG	SAW MILL		251	152960	STEAM	100	225	52800	67500	135000
003 9	A-3	BARBER & BROS	CLOTH FACTORY		182	150000	WATER	150	129	28000	90000	175000
002 1	A-3	GORDON & MACKAY	LYBSTER COTTON MI		181	150000	WATER	250	200	36000	66000	150000
007 7	B-2	BERLIEY & PATTIE	SAW MILL		251	150000	WATER	500	250	70000	240000	330000
005 4	A-1	CAMPBELL A H & CO	SAW MILL		251	143000	STEAM	120	80	14000	75000	110000
006 6	F	KINGSTON WATER WO	WATER WORKS		576	125000	S/WND	12	9	9000	4000	15000
002 4	B-2	MCLLWRATH THOMAS	HAMILTON GASLIGHT		574	125000	.	12	5300	12300	33854	21554
004 6	C-1	ALDWELL & CO	BREWERY/MALT HOUSE		109-B/108-M	120000	STEAM	25	40	10000	113500	405000
004 6	C-1	DICKEY NEIL &	ENGINEERING/FOUNDRY		315-E/326	120000	STEAM	50	230	80000	112900	275600
004 6	A-3	STONER STEEL & I	STEEL/IRON WORKS		315	120000	STEAM	24	6	1500	5730	20000
004 2	B	BARNHART NOAH &	FLOUR MILL		105	100000	W/S	140	3	2000	47000	56012
008 6	A-1	BEATTY J W & CO	SAW MILL		251/251-S	100000	WATER	40	88	18000	12000	30000
002 4	C-2	BECKETT F G & C	ENGINE/BOILER MF		315-E/301	100000	STEAM	50	120	40000	40000	100000
002 3	C-2	CANADA SCREW CO	IRON SCREWS		305-N	100000	STEAM	35	37	6030	6740	20210
004 2	H	CHRISTIE A R	SAW MILL		251	100000	WATER	250	87	25000	40000	85000
006 9	C-1	EDWARDSBURG STARC	STARCK FACTORY		108-S	100000	WATER	40	38	19500	43900	76184
003 1	D-3	GOLDIE/MCCULLOCH/	ENGINE/MACHINE WO		315-E/315	100000	STEAM	50	203	65000	27700	180000
004 7	A-4	GZOWSKI C & CO	ROLLING MILL		291-R	100000	STEAM	250	200	72000	387000	500000
007 5	C	HAMILTON BROS	SAW MILL		251	100000	WATER	1500	168	27000	400000	540000
004 7	A-3	HAMILTON WILLIAM	FOUNDRY/MACHINE S		315/326	100000	STEAM	60	200	100000	35000	620000
007 7	D-2	MCGILLIVRAY ED	GAZ		574	100000	STEAM	14	6000	11200	30000	182000
001 0	C-1	MORHEAD GEORGE	CABINET MANUFACTO		261	100000	STEAM	10	68	30000	40000	150000
007 7	A-2	SMILLIE BOURNE &	BANK NOTE COMPANY		286-B	100000	WATER	500	110	14300	35000	60000
005 3	B-3	SMITH R C & CO	SAW MILLS		251	100000	WATER	100	145	18000	110000	90000
007 3	D-1	WARWICK JOHN	WOOLEN FACTORY		182	100000	WATER	100	100	20000	150000	182000
007 7	B-2	YOUNG LEVI	SAW MILL		251	100000	WATER	250	274	50000	180000	276000
007 7	B-2	BALDWIN A H	SAW MILL		251	90000	WATER	250	274	50000	180000	276000
002 1	B-4		GAS WORKS		574	80000	STEAM	6	3000	35000	20000	55000
008 6	C-1	DODGE & CO	MAGNETAWAN LUMBER		251	80000	STEAM	100	47	10000	30000	45000
006 6	G	KERR JOHN	GAS LIGHT COMPANY		574	80000	WATER	120	62	8000	4250	13713
004 5	A-2	TAYLOR JOHN & BRO	PAPER MANUFACTORY		271	80000	WATER	100	163	35000	140000	220000
003 1	G	RANDALL & FARR &	WORSTED/WOOLEN MI		182	77000	WATER	75000	WATER	25000	40000	85000
004 2	H	HOTCHKISS HEWSON	SAW MILL		251	75000	WATER	75000	WATER	35000	36000	137000
002 1	B-1	TUTTLE DATE & ROD	AGRIC HAND TOOLS		306	70000	WATER	120	120	55000	410000	680000
002 4	B-3	HAMILTON ROLLING	ROLLING MILLS		291-R	70000	STEAM	25	225	80000	120000	200000
002 4	E-2	MCPHERSON JOHN &	BOOT/SHOE MF		174	70000	STEAM	25	175	50000	80000	120000

LEADING ONTARIO FIRMS BY MEASURE OF FIXED CAPITAL, 1871

65

CDID	CED	PROPRIOR	TYPEEST	SIC	FIXCAP	TYPEPOW	FORCE	TOTEMP	WAGES	SUMRAWC	SUMPROC	VADD
0013	F-2	NOXON BROS	FOUNDRY BREWERY	311/315 109-B/108-M	70000 STEAM 70000 STEAM	60 22 15 150 72	103 16 13000	42000 64000 5500 28840	50500 111400 28840 89000	111400 60900 89000 60160	60900 60160	
0047	B-4	O'KEEFE & CO	SAW MILL	251	70000 STEAM	150	72	13000	30000 44033 62000	30000 60000 60000 60000	30000 30000	
0049	H	THOMSON J & MILLE	TANNERY	251	65334 WATER	50	16	6400	44033 69187 62000	69187 25154 204800	25154 204800	
0068	D-1	CARRELS & RIVERS	SEWING M C	172	65000 STEAM	12	180	75000	12 29635	12 29635	12 29635	
0033	C-3	GUELPH SEWING M C	CAR FACTORY	326	60000 STEAM	138	138	29635	138 3308	138 3308	138 3308	
0068	C	B & O RAILWAY CO	GAS WORKS	574	60000 WATER	9	9	3308	5924	5924	5924	
0010	A	CITY GAS COMPANY	WOOLEN FACTORY	182	60000 WATER	6	67	12000	75000 19039 75000	19039 13115 120000	13115 120000	
0031	F	CROMBIE JAMES	WOOLEN MILL	182	60000 W/S	80	112	25000	72000 120000 72000	120000 48000 325000	48000 325000	
0054	B-3	FRASER & CO	FLOWR MILL	105	60000 WATER	70	20	6000	300000 100000 300000	300000 165000 100000	165000 650000	
0048	E-2	GIBBS & BRO	CABINET FACTORY	261	60000 STEAM	50	181	55000	100000 154000 100000	154000 220000 100000	220000 660000	
0048	E-2	GIBBS WM H	SAW MILL	251	60000 STEAM	110	170	360000	154000 200000 200000	154000 450000 200000	154000 450000	
0060	B	GILMOUR & CO	RAILWAY WORK SHOP	326	60000 STEAM	25	35	12000	45000 200000 45000	45000 650000 200000	45000 250000	
0051	B-2	MIDLAND RAILWAY C	RAILWAY WORK SHOP	251	60000 STEAM	8	62	26000	40000 110000 40000	40000 120000 120000	40000 180000	
0046	A-2	SMITH & WATT	SAW MILL	251	60000 WATER	85	34	11500	80000 110000 80000	80000 110000 110000	80000 110000	
0041	E-2	SPALDING & SAWYER	SAW MILL	251	60000 WATER	80	80	70000	110000 220000 110000	220000 210000 210000	220000 145000	
0047	A-1	THE GLOBE	PUBLISHING OFFICE	289	58000 STEAM	40	275	86000	65000 110000 65000	65000 120000 120000	65000 1003000	
0024	E-2	WANZER R M & C	SEWING MACHINE MF	315-S	57000 STEAM	40	118	40573	19700 860000 19700	860000 800000 800000	860000 620000	
0015	D-2	WATEROUS C H & C	ENGINES/MACHINERY	315-E/315	50000 STEAM	20	50	20000	18000 110000 18000	18000 900000 900000	18000 260000	
0047	B-2	ARMSTRONG J R	IRON FOUNDRY	307-S/294	50000 WATER	160	46	11000	64000 160000 64000	64000 160000 16000	64000 350000	
0038	G	BARBER JAMES	PAPER MILL	271	50000 STEAM	40	45	11500	19000 45000 19000	19000 45000 45000	19000 310000	
0060	C-1	BROWN G & J	MACHINE SHOP	311/315	50000 STEAM	40	50	11000	76000 310000 76000	76000 310000 310000	76000 310000	
0080	E	CALDWELL & WATCHO	WOOLEN MILLS	182	50000 STEAM	10	20	6000	31500 235000 31500	31500 550000 550000	31500 235000	
0010	F	CARLING WM & JO	BREWERY	109-B	50000 STEAM	12	14	8000	12000 550000 12000	12000 550000 550000	12000 430000	
0046	B-4	COSGRAVE & CO	BREWERY	109-B	50000 STEAM	12	14	8000	25000 107000 25000	25000 107000 107000	25000 793000	
0079	B	COSSTON & BRO	FOUNDRY/AGRIC IMPL	311/315	50000 WATER	60	65	27700	75000 330000 75000	75000 330000 330000	75000 2800000	
0056	C-1	DICKSON S	SAW MILL	251	50000 WATER	16	150	36250	42000 260000 42000	42000 260000 260000	42000 2800000	
0009	C-6	ENGLEHART & CO	PETROLEUM OIL RFN	365	50000 STEAM	30	50	25000	260000 175000 260000	260000 175000 175000	260000 425000	
0024	D-2	GALBRAITH & GREEN	FELT HAT WORKS	249-H	50000 STEAM	30	74	21025	60000 175000 60000	60000 175000 175000	60000 254000	
0039	A-3	GOODERHAM & WORTS	FLOUR MILL	105	50000 WATER	80	35	16000	35 175000 35	16000 254000 254000	16000 790000	
0042	C	HAY & PATON	LUMBER/FURNITURE	261/251	50000 STEAM	50	32	12480	50 256000 50	256000 256000 256000	256000 330000	
0046	A-1	HENDERSON & BOSTW	HAT/BONNET MF	249-H	50000 STEAM	15	201	24700	14400 24700 14400	24700 24700 24700	24700 553000	
0067	B	JONES D FORD & CO	SHOVEL/FORK FACTO	306	50000 WATER	150	55	15000	55000 800000 55000	55000 800000 800000	55000 250000	
0050	B-1	MCARTHUR F F	FURNITURE MF CO	261	50000 STEAM	40	175	58000	50000 135000 50000	50000 135000 135000	50000 850000	
0054	B-2	MCCALLUM PETER &	CLOTHING EST	242	50000 STEAM	22	22	50000	40000 40000 40000	40000 500000 50000	40000 500000	
0010	C-1	MCCLARRY J & O	FOUNDRY	307-S/311	50000 STEAM	25	73	30000	60000 100000 60000	60000 100000 100000	60000 400000	
0044	B-2	MCCLAUGHLIN BROS	SAW MILL	251	50000 WATER	260	100	15000	90000 200000 90000	90000 200000 200000	90000 200000	
0065	B-2	PATTERSON BROS	AGRIC MACHINE WORK	311	50000 W/S	30	125	50000	30650 30650 30650	30650 30650 30650	30650 82980	
0061	B-1	RATHBUN H B & S	SAW MILL	174	50000 STEAM	125	15000	15000	15000 150000 15000	15000 150000 15000	15000 150000	
0046	A-1	ROBERTSON & COOK	PRINTING OFFICE	289	50000 STEAM	150	95	70000	70000 100000 70000	70000 100000 100000	70000 100000	
0077	C-1	TAYLOR ISAAC B	PRINTING EST	289	50000 STEAM	25	140	50000	40000 113397 40000	40000 113397 113397	40000 113397	
0039	A-2	WHITE SOLOMON	WINE	109-W	50000 STEAM	8	26	3200	1800 15000 1800	1800 15000 15000	1800 15000	
0022	C-1	WILLIAMS JAMES &	OIL REFINERY	365	50000 STEAM	50	50	20000	220000 220000 220000	220000 220000 220000	220000 400000	
0001	J-2	WALKER HIRAM	DISTILLER/MALSTER	109-D	47200 STEAM	45	106	45700	240000 140754 240000	240000 140754 140754	240000 62854	
0047	A-1	HALLAM JOHN	HIDE CURING FACTO	172	46000 STEAM	5	5	3000	3000 1114982 3000	3000 1114982 1114982	3000 874982	
0077	F	SCOON J A	STRATHROY WOOLEN	182	46000 STEAM	35	57	13000	54000 34400 54000	54000 34400 34400	54000 360000	
0052	E-1	BOYD M ?	SAW MILL	251	45000 WATER	140	102	35000	52000 48000 52000	52000 48000 48000	52000 100000	
0080	B	ELLIOTT/ROUTH/SHE	WOOLEN MANUFACTUR	182	45000 STEAM	50	66	14988	42149 32851 42149	42149 32851 32851	42149 640000	
0004	J-1	MORNINGSTAR S & M	GRIST MILL	105	45000 WATER	25	2	750	10000 640000 10000	10000 640000 640000	10000 640000	
0021	B-1	NORRIS JAMES	FLOWR MILLS	105	45000 WATER	120	25	25	10000 640000 10000	10000 640000 640000	10000 640000	

Appendix A-4

LEADING ONTARIO FIRMS BY MEASURE OF VALUE ADDED, 1871

CDID	CED	PROPRIOR	TYPEEST	SIC	FIXCAP	TYPEPOP	FORCE	TOTEMP	WAGES	SUMRAWC	SUMPROC	VADD
0047	A-3	GOODERHAM & WORTS	DISTILLERY	109-D	350000 STEAM	116	150	60000	450000	1470000	1020000	
0001	J-2	WALKER HIRAM	DISTILLER/MALSTER	109-D	47200 STEAM	45	106	45700	240000	1114982	874982	
0047	A-3	HAMILTON WILLIAM	FOUNDRY/MACHINE S	315/326	100000 STEAM	60	200	100000	35000	620000	585000	
0069	C-1	BENSON W T	GRIST MILL	105	20000 WATER	34	2	900	95000	460000	365000	
0046	C-6	ALDWELL & CO	BREWERY/MALT HOU	109-B/108-M	120000 STEAM	25	40	100000	113500	405000	291500	
0009	C-6	ENGLEHART & CO	PETROLEUM OIL RFN	365	50000 STEAM	30	50	25000	260000	540000	280000	
0024	B-3	HAMILTON ROLLING	ROLLING MILLS	291-R	70000 STEAM	400	225	80000	410000	680000	270000	
0015	D-1	GRAND TRUNK RAILW	REPAIR SHOP	326	435000 STEAM	30	315	182000	82000	326000	244000	
0048	E-2	HALL JOSEPH & CO	ENGINES/AGRC IMPL	315-E/311	200000 STEAM	50	266	125000	56600	300000	243400	
0047	A-1	BEARD BROS & CO	CANADIAN STOVE WO	307-S	20000 STEAM	15	100	250000	46100	250000	203900	
0022	C-1	WILLIAMS JAMES &	OIL REFINERY	365	50000 STEAM	50	50	200000	220000	400000	180000	
0019	G	THOMAS W H	DISTILLERY	109-D	35000 STEAM	21	7500	47000	224639	177639	177639	
0069	B-2	WISER & EGGART	DISTILLERY	109-D	30000 STEAM	100	38	19000	70000	240000	170000	
0046	C-1	DICKIE NEIL &	ENGINE/FOUNDRY	315-E/326	120000 STEAM	50	230	80000	112900	275600	162700	
0031	D-3	GOLDIE/MCCULLOCH/	ENGINE/MACHINE WO	315-E/315	100000 STEAM	50	203	65000	27700	180000	152300	
0047	A-1	BEATY JAMES	PUBLISHING/PRINTE	289	165000 STEAM	20	80	60000	100000	250000	150000	
0024	A-1	BOWMAN WILSON & C	SEWING MACHINE MF	315-S	8000 STEAM	15	131	60000	50000	200000	150000	
0003	F-1	DAY D P W	SAW MILL	251	6000 STEAM	20	12	3000	100000	250000	150000	
0067	G-2	GORREL JAMES	SAW MILL	251	6000 WATER	50	40	4600	10000	16000	150000	
0046	A-1	HAY R & CO	CABINETS/UPHOLSTE	261	400000 STEAM	40	430	120000	350000	500000	150000	
0024	E-2	WANZER R M & C	SEWING MACHINE MF	315-S	580000 STEAM	40	275	860000	650000	210000	145000	
0033	C-3	GUELPH SEWING M C	SEWING MACHINE FC	315-S	65000 STEAM	12	180	75000	62000	204800	142800	
0075	C	HAMILTON BROS	SAW MILL	251	100000 WATER	1500	168	27000	400000	540000	140000	
0082	E	SUPPLE MARIANNE	SAW MILL	251	100000 WATER	20	22	7000	10000	150000	140000	
0032	E-2	RANDALL GEORGE &	DISTILLERY	109-D	15000 STEAM	25	7	2700	50000	186000	136000	
0065	C	CALVIN & BRECK	RAFT BUILDING	031	320000 WATER	25	156	40000	22400	150000	127600	
0077	B-2	BRONSON & WESTON	SAW MILL	251	350000 WATER	2500	300	70000	240000	360000	120000	
0046	A-1	SESSIONS/TURNER/C	BOOTS/SHOE MF	174	30000 STEAM	15	510	100000	180000	300000	120000	
0022	C-1	DAVIS JOHN T	PORK PACKING EST	101-P/101	30000 STEAM	6	50	12000	294250	412000	117750	
0014	C	COPELAND S M	FLAX MILL	189-F	900 STEAM	14	18	4200	16000	129000	113000	
0047	A-4	GWOWSKI C & CO	ROLLING MILL	291-R	100000 STEAM	250	200	72000	387000	500000	1130000	
0022	E-2	WILSON J F	SAW MILL	251/251-S	1500 STEAM	40	20	4800	12000	124865	112865	
0046	B-1	HUNTER & ROSE & C	PRINTER/BINDER Y	286/287-B	40000 STEAM	25	173	48000	50000	160000	110000	
0010	C-1	MOORHEAD GEORGE	CABINET MANUFACTO	261	100000 STEAM	10	68	30000	40000	150000	110000	
0047	A-1	THE GLOBE	PUBLISHING OFFICE	289	60000 STEAM	10	80	70000	110000	220000	110000	
0047	A-4	MORRISON JOHN	PORK CURING EST	101-P	110000 STEAM	15	32	5376	168000	276300	108300	
0009	C-6	WATERMAN H & I	PETROLEUM REFININ	365	30000 STEAM	15	20	8000	72000	180000	108000	
0066	F	CANADIAN ENGINE C	RAILWAY CARS/ENGI	326/315-E	200000 STEAM	20	173	75000	200988	306000	105012	
0004	G-1	BLACK STAR OIL WO	OIL REFINERY	365	100000 STEAM	12	11	5700	37500	140000	102500	
0021	B-1	TUTTLE DATE & ROD	AGRC HAND TOOLS	306	75000 WATER	350	120	55000	36000	137000	101000	
0015	D-2	WATEROUS C H & C	ENGINES/MACHINERY	315-E/315	57000 STEAM	40	118	40573	19700	120000	100300	
0047	A-1	DAMER KING & CO	BOOT/SHOE FACTORY	174	20000 STEAM	15	191	52000	150000	250000	100000	
0046	A-1	ROBERTSON & COOK	PRINTING OFFICE	289	50000 STEAM	10	95	70000	100000	200000	100000	
0024	E-2	SANFORD & MCINNES	CLOTHING MF	242	40000 STEAM	30	455	60000	250000	350000	100000	
0029	E-3	THOMPSON & WILLIA	AGRC WORKS/ENGINE	311/315-E	250000 STEAM	20	106	40000	50000	150000	100000	
0077	B-2	BALDWIN A H	SAW MILL	251	90000 WATER	250	274	50000	18000	276000	96000	
0021	A-3	WON POHENHOFF A R	OIL REFINERY	365	250000 STEAM	20	15	8000	40000	135000	95000	
0024	D-1	GURNEY E & C	IRON FOUNDER	307-S/294	20000 STEAM	20	101	45000	45200	140000	94800	
0047	A-3	CONSUMERS GAS CO	GAS WORKS	574	400000 STEAM	10	51	19000	33000	124000	91000	
0077	B-2	PERLEY & PATTEE	SAW MILL	251	150000 WATER	500	250	70000	240000	330000	90000	
0021	A-3	RIORDAN JOHN	PAPER MILLS	271	156000 WATER	200	100	30000	70000	160000	100000	

LEADING ONTARIO FIRMS BY MEASURE OF VALUE ADDED, 1871

PROPRIETOR	LOCATION	TYPE ESTABLISHMENT	POWER FORCE	MEN	WOM	TOTEMP	VADD RANK
CHILDS & HAMILTON	TORONTO	BOOTS & SHOES	0	134	42	192	75000 47
CALVIN & BRECK	GARDEN ISLAND	RAFT BUILDING	0	140	0	156	127600 45
SANFORD MACINNES & CO	HAMILTON	CLOTHING MANUFACTURE	0	65	300	455	100000 22
PATERSON JOHN & CO	TORONTO	BOOTS & SHOES	0	100	50	154	60000 60
HAMILTON ROLLING MILLS	HAMILTON	ROLLING MILLS	STEAM 400	190	0	225	270000 8
GWOWSKI C & CO	TORONTO	ROLLING MILL	STEAM 250	180	0	200	113000 10
RATHBUN H B & SON	DESERONTO	STEAM SAW MILL	STEAM 150	237	0	311	62B54 41
NORTHERN RAILWAY	TORONTO	RAILWAY CARS/LOCOMOTIVES	STEAM 130	84	2	87	100000 43
GOODERHAM & WORTS	TORONTO	STEAM MILLS/DISTILLERY	STEAM 116	150	0	150	1020000 4
GILMOUR & COMPANY	TRENTON	SAW MILL	STEAM 110	150	0	170	66000 31
MCDougall & Ludgate	HAMILTON TP	SAW MILL	STEAM 100	225	0	225	67500 29
NOXON BROTHERS	INGERSOLL	FOUNDRY/AGRIC IMPLEMENTS	STEAM 60	100	0	103	60900 57
HAMILTON WILLIAM	TORONTO	ST LAWRENCE FOUNDRY	STEAM 60	200	0	200	5B5000 6
HALL JOSEPH CO	OSHAWA	ENGINES/AGRC IMPLEMENTS	STEAM 50	250	0	266	243400 5
GOLDIE MCCULLOCH CO	GALT	ENGINES/MACHINE WORKS	STEAM 50	200	0	203	152300 15
GIBBS WILLIAM H	OSHAWA	CABINETS	STEAM 50	160	15	181	65000 35
BECKETT F G & CO	HAMILTON	STEAM ENGINES/BOILERS	STEAM 50	112	0	120	60000 50
DICKEY NEILL & CO	TORONTO	SOHO FOUNDRY/STEAM ENGINES	STEAM 50	230	0	230	162700 9
WILLIAMS JAMES & CO	BARTON TP	OIL REFINERY	STEAM 50	35	0	50	1B0000 33
WALKER HIRAM	SANDWICH E TP	DISTILLER/MALTSTER	STEAM 45	106	0	106	8749B2 22
HAY R & CO	TORONTO	CABINETS/UPHOLSTERY	STEAM 40	380	50	430	150000 2
WATEROUS C H & CO	BRANTFORD	BRANTFORD ENGINES WORKS	STEAM 40	118	0	118	100300 48
WANZER R M & CO	HAMILTON	SEWING MACHINE FACTORY	STEAM 40	193	0	275	145000 18
MCARTHUR F F	BOWMANVILLE	FURNITURE	STEAM 40	125	30	175	85000 42
SMART JAMES	BROCKVILLE	STOVE/IRONWARE FACTORY	STEAM 32	125	0	160	90000 46
GRAND TRUNK RAILWAY	BRANTFORD	REPAIR SHOPS	STEAM 30	300	1	315	244000 3
THOMPSON & WILLIAMS	MITCHELL	AGRIC IMPLS/ENGINES	STEAM 30	104	0	106	100000 56
ENGLEHART & CO	LONDON TP	PETROLEUM OIL REFINERY	STEAM 30	40	0	50	2B0000 32
HUNTER ROSE & CO	TORONTO	PRINTER/BINDERY	STEAM 25	70	100	173	110000 37
MCPHERSON JOHN & CO	HAMILTON	BOOTS & SHOES	STEAM 25	114	45	175	80000 28
TAYLOR ISAAC B	OTTAWA	PRINTING: THE CITIZEN	STEAM 25	130	0	140	73797 52
BEATY JAMES: THE LEADER	TORONTO	NEWSPAPERS/BOOKS	STEAM 20	70	0	80	150000 21
GURNEY E & CO	HAMILTON	IRON FOUNDRY	STEAM 20	100	0	101	94800 49
CANADIAN ENGINE CO	KINGSTON	RAILWAY CARS/ENGINES	STEAM 20	169	0	173	105012 13
SESSIONS/TURNER/COOPER	TORONTO	BOOTS & SHOES	STEAM 15	330	90	510	120000 26
DAMER KING & CO	TORONTO	BOOTS & SHOES	STEAM 15	105	60	191	100000 43
WILSON BOWMAN & CO	HAMILTON	SEWING MACHINES	STEAM 15	90	1	131	150000 54
HENDERSON/BOSTWICK	TORONTO	HATS/BONNETS	STEAM 15	12	175	201	55300 59
BEARD BROS & CO	TORONTO	CANADIAN STOVE WORKS	STEAM 15	60	0	100	203900 57
GUELPH SEWING MACHINE CO	GUELPH	SEWING MACHINES	STEAM 12	157	0	180	142B00 20
MOORHEAD GEORGE	LONDON	CABINET MAKER	STEAM 10	58	3	68	110000 40
ROBERTSON & COOK	TORONTO	PRINTER: DAILY TELEGRAPH	STEAM 10	75	0	95	100000 39
GREAT WESTERN RAILWAY	HAMILTON	RAILWAY CARS/LOCOMOTIVES	STEAM 0	629	1	630	400000 1
THE GLOBE PUBLISHER	TORONTO	PRINTER/NEWSPAPER	STEAM 0	70	0	80	110000 36
YOUNG LAW & CO	DUNDAS	DUNDAS COTTON MILLS	W/S 90	30	66	143	90000 19
PATTERSON BROS	VAUGHAN TP	AGRICULTURAL MACHINERY	W/S 30	125	0	125	82990 51
BRONSON WESTON & CO	OTTAWA	SAW MILL	WATER 2500	300	0	300	120000 6
HAMILTON BROTHERS	HAWKESBURY	SAW MILLS	WATER 1500	132	0	168	140000 11
PERLEY & PATTEE	OTTAWA	SAW MILL	WATER 500	250	0	250	90000 12
TUTTLE DATE & RODDEN	ST CATHARINES	AGRICULTURAL HAND TOOLS	WATER 350	120	0	120	101000 37
GORDON MCKAY	MERRITTON	LYBSTER COTTON MILLS	WATER 250	47	73	200	84000 25
BOOTH JAMES R	OTTAWA	SAW MILL	WATER 250	200	0	200	70000 17
BALDWIN A H	OTTAWA	SAW MILL	WATER 250	274	0	274	96000 16
RIORDON JOHN	MERRITTON	ST CATHARINES PAPER WORKS	WATER 200	80	20	100	90000 30
ROSAMOND B & W & CO	ALMONTE	WOOLEN FACTORY	WATER 160	74	105	209	80000 14
BARBER & BROS	TORONTO TP	WOOL CLOTH FACTORY	WATER 150	56	31	129	85000 27
YOUNG LEVI	OTTAWA	SAW MILL	WATER 100	100	0	100	32000 53
RANDALL FARR & CO	HESPELER	WORSTED/WOOLEN MILL	WATER 100	45	44	163	60000 34
CORNWALL MANUFACTURING CO	CORNWALL TP	WOOLEN FACTORY	WATER 100	40	50	145	90000 24
GOODERHAM & WORTS	TORONTO TP	FLOUR MILL	WATER 80	35	0	35	79000 55

PROPRIETOR	TYPE ESTABLISHMENT		ORIGIN	START	END	INCORP	LOCATION
BALDWIN A H	SAW MILL	SCOT	1853	1890*			OTTAWA
BARBER & BROS	WOOL CLOTH FACTORY	NIRE	1844	1885			TORONTO TP
BEARD BROS & CO	CANADIAN STOVE WORKS		1870*				TORONTO
BEATY JAMES: THE LEADER	NEWSPAPERS/BOOKS		1855	1878			TORONTO
BECKETT F G & CO	STEAM ENGINES/BOILERS		1870*				HAMILTON
BOOTH JAMES R	SAW MILL	NIRE	1858	1946			OTTAWA
BRONSON WESTON & CO	SAW MILL	US	1853	1893			OTTAWA
CALVIN & BRECK	RAFT BUILDING	US	1836	1914	1886		GARDEN ISLAND
CANADIAN ENGINE CO	RAILWAY CARS/ENGINES	SCOT	1850	1968	1862		KINGSTON
CHILDS & HAMILTON	BOOTS & SHOES	MONT	1855	1886			TORONTO
CORNWALL MANUFACTURING CO	WOOLEN FACTORY	MONT	1868	1903	1867		CORNWALL TP
DAMER KING & CO	BOOTS & SHOES		1865	1883			TORONTO
DICKEY NEILL & CO	SOHO FOUNDRY/STEAM ENGINES	NIRE	1840	1890*			TORONTO
ENGLEHART & CO	PETROLEUM OIL REFINERY	US	1870	1883			LONDON TP
GIBBS WILLIAM H	CABINETS	ENG	1868	1886			OSHAWA
GILMOUR & COMPANY	SAW MILL	SCOT	1852	1910			TRENTON
GOLDIE MCCULLOCH CO	ENGINES/MACHINE WORKS	SCOT	1848	*	1891		GALT
GOODERHAM & WORTS	STEAM MILLS/DISTILLERY	ENG	1832	*	1882		TORONTO
GOODERHAM & WORTS	FLOUR MILL	ENG	1844	1880			TORONTO TP
GORDON MCKAY	LYBSTER COTTON MILLS	SCOT	1861	1890			MERRITTON
GRAND TRUNK RAILWAY	REPAIR SHOPS		1856	1895	1854		BRANTFORD
GREAT WESTERN RAILWAY	RAILWAY CARS/LOCOMOTIVES		1854	1889	1853		HAMILTON
GUELPH SEWING MACHINE CO	SEWING MACHINES		1869	1887			GUELPH
GURNEY E & CO	IRON FOUNDRY	US	1842	1893			HAMILTON
GWOWSKI C & CO	ROLLING MILL		1857	1885*			TORONTO
HALL JOSEPH CO	ENGINES/AGRIC IMPLEMENTS	US	1857	1886			OSHAWA
HAMILTON BROTHERS	SAW MILLS	NIRE	1808	1923			HAWKESBURY
HAMILTON WILLIAM	ST LAWRENCE FOUNDRY	SCOT	1852	1888*			TORONTO
HAMILTON ROLLING MILLS	ROLLING MILLS		1864	1872	1853		HAMILTON
HAY R & CO	CABINETS/UPHOLSTERY	SCOT	1835	1922			TORONTO
HENDERSON/BOSTWICK	HATS/BONNETS		1864*	1884*			TORONTO
HUNTER ROSE & CO	PRINTER/BINDERY		1865	1980			TORONTO
MCARTHUR F F	FURNITURE		1855	1890			BOWMANVILLE
MCDougall & Ludgate	SAW MILL		1866	1890*			HAMILTON TP
MCPHERSON JOHN & CO	BOOTS & SHOES		1859	1884*			HAMILTON
MOORHEAD GEORGE	CABINET MAKER		1870*	1900*			LONDON
NORTHERN RAILWAY	RAILWAY CARS/LOCOMOTIVES		1855	1882	1849		TORONTO
NOXON BROTHERS	FOUNDRY/AGRIC IMPLEMENTS	US	1856	1913*	1872		INGERSOLL
PATERSON JOHN & CO	BOOTS & SHOES		1870*				TORONTO
PATTERSON BROS	AGRICULTURAL MACHINERY	US	1850	1892			VAUGHAN TP
PERLEY & PATTEE	SAW MILL	US	1857	1893			OTTAWA
RANDALL FARR & CO	WORSTED/WOOLEN MILL	US	1864	1958			HESPELER
RATHBUN H B & SON	STEAM SAW MILL	US	1848	1923	1883		DESERONTO
RIORDAN JOHN	ST CATHARINES PAPER WORKS	NIRE	1862	1923	1890		MERRITTON
ROBERTSON & COOK	PRINTER: DAILY TELEGRAPH		1866	1872			TORONTO
ROSAMOND B & W & CO	WOOLEN FACTORY	NIRE	1857	1952	1870		ALMONTE
SANFORD MACINNES & CO	CLOTHING MANUFACTURE	US	1862	1925*	1887		HAMILTON
SESSIONS/TURNER/COOPER	BOOTS & SHOES		1858	1883			TORONTO
SMART JAMES	STOVE/IRONWARE FACTORY	SCOT	1854	1965	1881		BROCKVILLE
TAYLOR ISAAC B	PRINTING: THE CITIZEN		1851	*			OTTAWA
THE GLOBE PUBLISHER	PRINTER/NEWSPAPER	SCOT	1844	*			TORONTO
THOMPSON & WILLIAMS	AGRIC IMPLS/ENGINES		1863	1890			MITCHELL
TUTTLE DATE & RODDEN	AGRICULTURAL HAND TOOLS	US	1869	1966	1873		ST CATHARINES
WALKER HIRAM	DISTILLER/MALTSTER	US	1858	*	1890		SANDWICH E TP
WANZER R M & CO	SEWING MACHINE FACTORY	US	1859	1892			HAMILTON
WATEROUS C H & CO	BRANTFORD ENGINES WORKS	US	1848	*	1874		BRANTFORD
WILLIAMS JAMES & CO	OIL REFINERY	US	1860	1880*			BARTON TP
WILSON BOWMAN & CO	SEWING MACHINES		1868	1884			HAMILTON
YOUNG LAW & CO	DUNDAS COTTON MILLS	SCOT	1858	1890			DUNDAS
YOUNG LEVI	SAW MILL	US	1854	1890?			OTTAWA

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